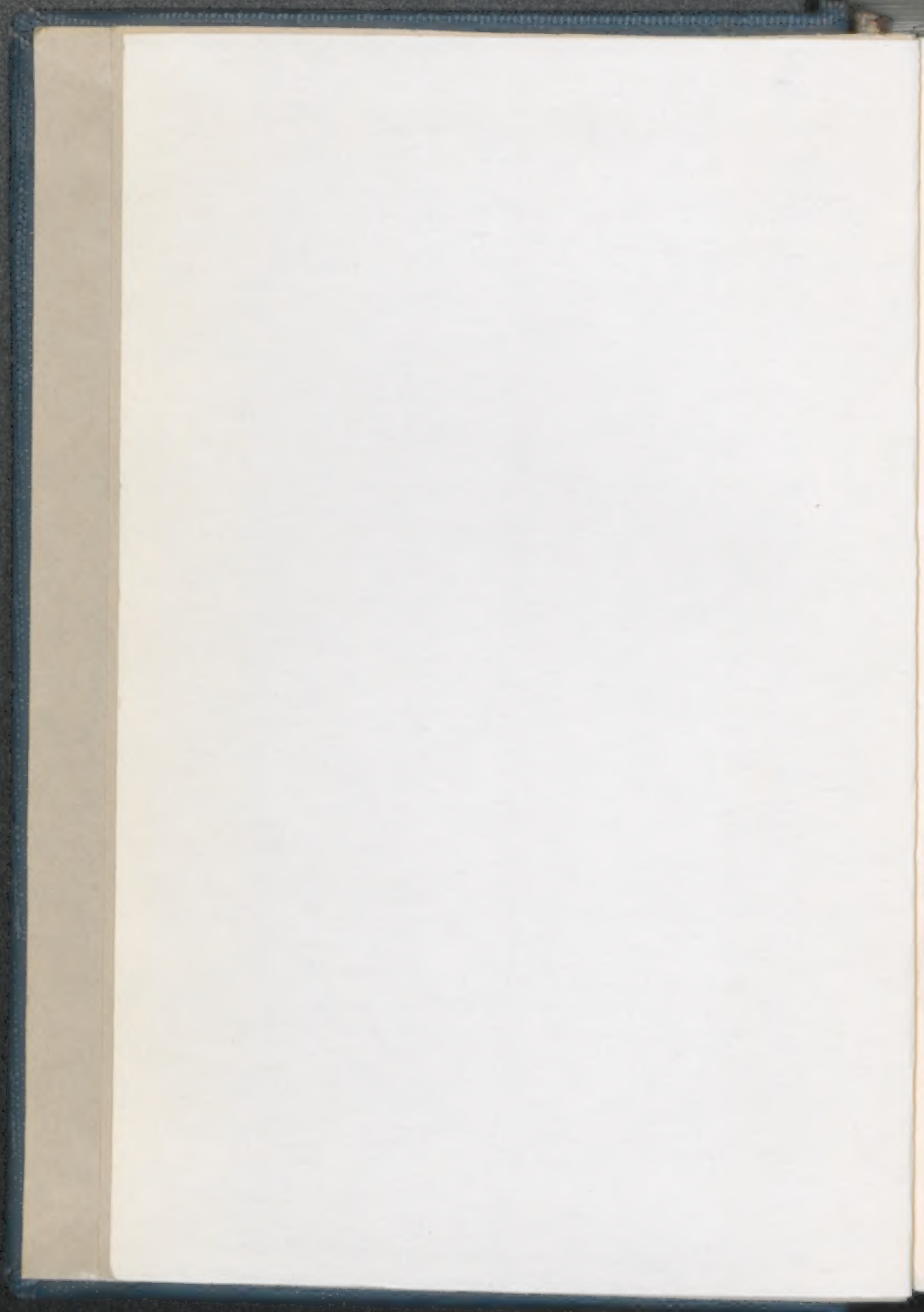


THE
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CATALOGUE



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THE SUMMER SESSIONS

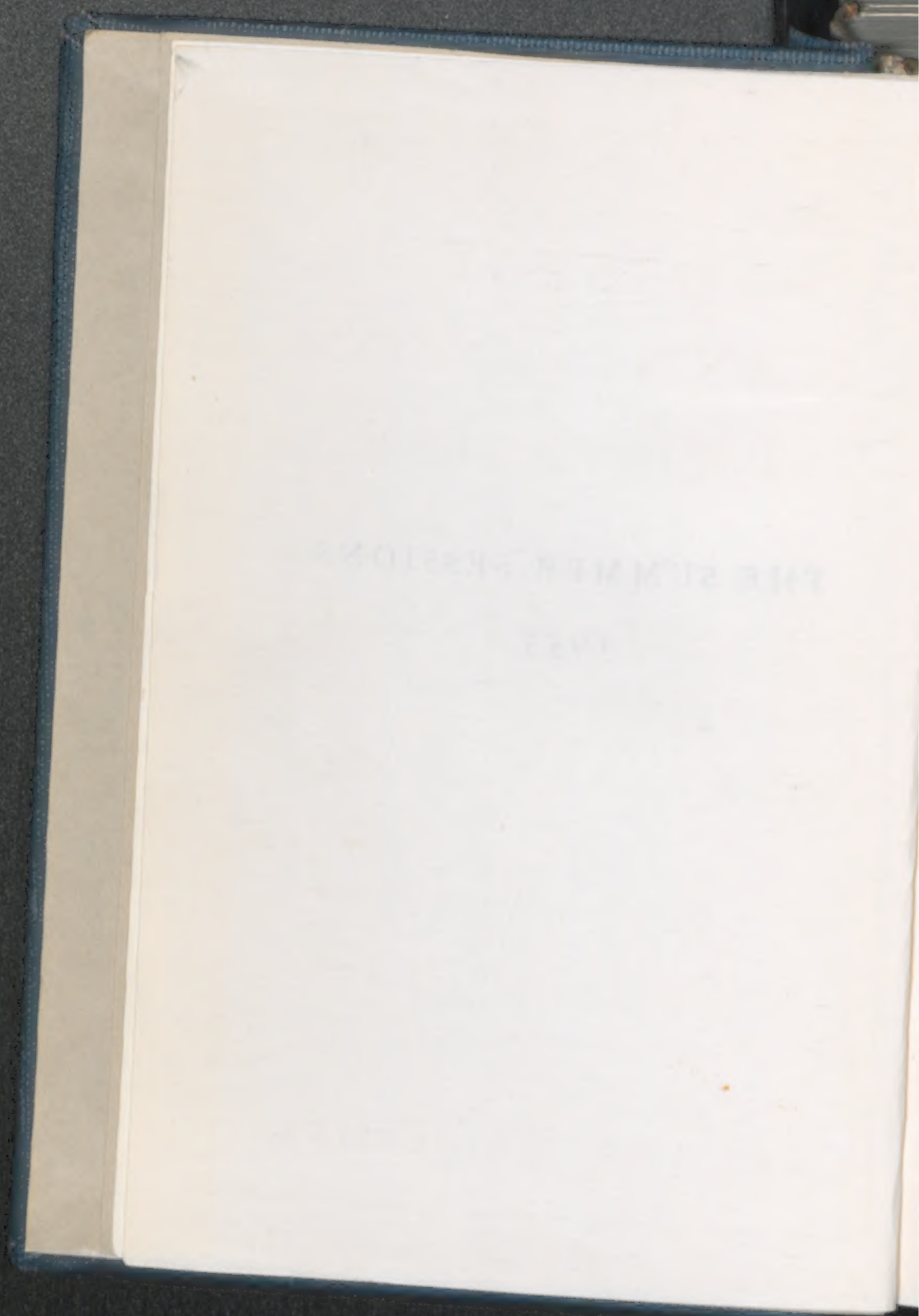
1955

THE SUMMER SESSIONS

WASHINGTON, D. C.

ESTABLISHED BY ACT OF CONGRESS
MARCH 3, 1845

BY THE UNIVERSITY



THE
GEORGE
WASHINGTON
UNIVERSITY
BULLETIN

VOL. LIV

No. I

THE SUMMER SESSIONS

WASHINGTON, D. C.

PUBLISHED IN JANUARY
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BY THE UNIVERSITY

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WASHINGTON
UNIVERSITY

BULLETIN

THE SUMMER SESSIONS

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CALENDAR OF THE 1955 SUMMER SESSIONS

Date	Day	Occasion
June 20	Monday	Registration for the eight-week term*
June 21	Tuesday	Classes begin
July 4	Monday	Independence Day. Holiday
Aug. 13	Saturday	Foreign-language examinations for candidates for the Master's degrees
Aug. 15	Monday	Eight-week term ends
		Last day for receiving theses for the Master's degrees and for the professional degrees in Engineering to be conferred in November
Sept. 9	Friday	Last day for receiving dissertations of candidates for the degrees of Doctor of Philosophy and Doctor of Education to be conferred in November

THE LAW SCHOOL

June 10	Friday	Registration for the first session
June 13	Monday	Classes begin
July 4	Monday	Independence Day. Holiday
July 9	Saturday	Make-up class
July 20	Wednesday	Last day of classes for the first session
July 22 and 23	Friday and Saturday ..	First-session examination period
July 25	Monday	Registration
July 27	Wednesday	Classes begin
Sept. 2	Friday	Last day of classes for the second session
Sept. 5	Monday	Labor Day. Holiday
Sept. 6-8	Tuesday through Thursday	Second-session examination period

THE SCHOOL OF EDUCATION—SPECIAL SESSIONS

June 13	Monday	Registration and first day of classes of the pre-session
July 1	Friday	Pre-session ends
July 4	Monday	Independence Day. Holiday
July 5	Tuesday	Registration and first day of classes of the special six-week session
Aug. 12	Friday	Special six-week session ends
Aug. 15	Monday	Registration and first day of classes of the post-session
Sept. 2	Friday	Post-session ends

Registration for the academic year 1955-56 will be held September 22 and 23.

* For all schools and colleges offering courses in the Summer Term except the Law School and the School of Education.

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THE UNIVERSITY

THE BOARD OF TRUSTEES

The Board of Trustees of the University is composed of the President of the University *ex officio* and the following persons by election:

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* Nominated by the Alumni.

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THE UNIVERSITY

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Warren Reed West, Ph.D., *Dean of the Division of Special Students*
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Carr Bartleson Lavell, A.M., *Assistant Dean in the Junior College*

Calvin Darlington Linton, Ph.D., *Assistant Dean of Columbian College*
Carville Dickinson Benson, A.B., LL.B., S.J.D., *Assistant Dean of the*
Law School

Louis Harkey Mayo, B.S., LL.B., *Assistant Dean of the Law School*

Joe Lee Jessup, M.B.A., *Assistant Dean in the School of Government*

John Francis Latimer, Ph.D., *Assistant Dean of the College of General*
Studies; University Marshal

John Gage Allee, Jr., A.M., *Assistant Dean of the Division of Univer-*
sity Students

THE UNIVERSITY

HISTORY AND ORGANIZATION

The idea of a university in the Capital of the Nation was sponsored by George Washington, who during his public life urged the establishment of such an institution and who in his will left fifty shares of stock in the Potomac (Canal) Company for the endowment of a university to be established in the District of Columbia "to which the youth of fortune and talents from all parts thereof might be sent for the completion of their Education in all the branches of polite literature;—in arts and Sciences,—in acquiring knowledge in the principles of Politics & good Government".

Columbian College in the District of Columbia was chartered by an act of Congress of February 9, 1821. In 1873 the name was changed to "Columbian University" and in 1904 to "The George Washington University".

The George Washington University includes fourteen colleges, schools, and divisions, as follows:

The Junior College offers the work of the first two years of the four-year college program in the liberal arts and sciences; two years of pre-professional work; and two-year terminal courses. Each of these curricula leads to the degree of Associate in Arts.

Columbian College offers the work of the junior and senior years of the four-year college program in the liberal arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. It also offers the studies leading to the degrees of Master of Arts and Master of Science in the fields of the liberal arts and sciences.

The Graduate Council offers a program of advanced study and research leading to the degree of Doctor of Philosophy.

The School of Medicine offers work leading to the degree of Doctor of Medicine.

The Law School offers curricula leading to the degrees of Bachelor of Laws, Juris Doctor, Master of Laws, Master of Comparative Law (for foreign students wishing (1) to return to their own countries or (2) to remain in this country for the practice of law), and Doctor of Juridical Science.

The School of Engineering offers courses leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering, Master of Engineering Administration, and Master of Science in Engineering. It also directs work leading to the professional degrees in the fields of civil, electrical, and mechanical engineering.

The School of Pharmacy offers courses leading to the degrees of Bachelor of Science in Pharmacy and Master of Science in Pharmacy.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education, Bachelor of Science in Home Economics, and Bachelor of Science in Physical Education, and graduate studies leading to the degrees of Master of Arts in Education and Doctor of Education.

The School of Government offers undergraduate programs of study in Foreign Affairs, Accounting, Business Administration, and Statistics, leading to the degree of Bachelor of Arts in Government. Graduate work is offered leading to the degrees of Master of Arts in Government in the fields of Foreign Affairs, Economic Policy, Accounting, Business and Economic Statistics, and Counseling; Master of Arts in Public Administration in the fields of General Administration and Governmental Fiscal Administration; Master of Arts in Personnel Administration; Master of Business Administration; and Doctor of Business Administration.

The College of General Studies includes the following divisions: the Off-Campus Division, the Campus Division, and the Division of Community Services. The college is designed for adults, and sponsors a program of credit and non-credit courses throughout the year.

The Division of University Students makes available courses for mature students not candidates for degrees in this University.

The Division of Special Students makes available courses for students in the process of qualifying for degree candidacy.

The Division of Air Science offers a program of Air Force ROTC training which is integrated with the curricula of the colleges and schools of the University and leads to appointment as a commissioned officer in the United States Air Force Reserve.

The Summer Sessions.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine is a member of the Association of American Medical Col-

leges, and is one of the medical colleges which have been continuously approved by the American Medical Association. The School of Pharmacy is accredited by the American Council on Pharmaceutical Education as a Class "A" school and is a member of the American Association of Colleges of Pharmacy. The School of Engineering is on the accredited list of the Engineers' Council for Professional Development. The School of Education is a charter member of the American Association of Colleges for Teacher Education.

LOCATION

The George Washington University is in downtown Washington, four blocks west of the White House and east of the Potomac River with its extensive parkway. Readily accessible to the University are many of the departments of the Government, including the Department of State, the Department of the Treasury, the Department of Justice, the Department of the Army, the Department of the Navy, the Department of the Interior, the Department of Agriculture, the Department of Commerce, and the Department of Labor; as well as the National Archives, the Capitol, the Library of Congress, the National Academy of Sciences, the Pan American Union, the National Gallery of Art, and the Corcoran Gallery of Art.

EDUCATIONAL FACILITIES

Buildings, grounds, and equipment of the University are valued at approximately \$19,000,000. The buildings of the colleges, schools, and divisions offered Summer Sessions work are in the vicinity of Twenty-first and G Streets, NW.

The University Library.—The University Library contains 270,000 volumes, and with the exception of the law and medical collections is housed in the Library Building.

Regulations governing the use of the library, the circulation of books, and the use of reserve books and periodicals are available at the service desks of the Library.

OTHER LIBRARY FACILITIES IN WASHINGTON

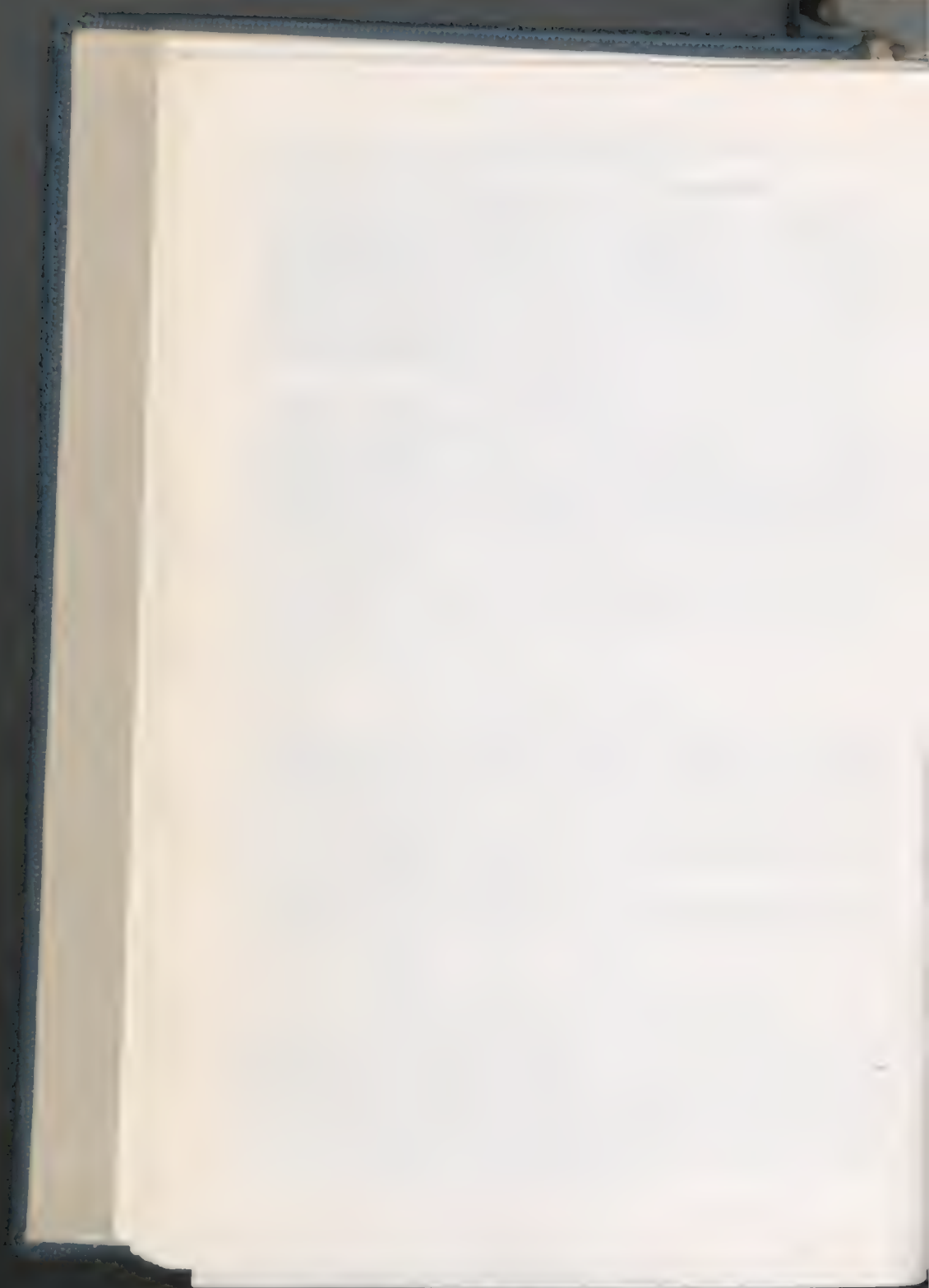
The student has access also to the Library of Congress, the Public Library of the District of Columbia and its branches, the Library of the Pan American Union, the Library of the Bureau of Railway Economics, the Library of the United States Department of Agriculture, the Library of the United States Office of Education, the Army Medical Library, the Library of the Smithsonian Institution, and many other great special collections of the government departments.

RESEARCH FACILITIES OF WASHINGTON

The arrangement of the summer schedule of classes permits the full-time student to avail himself of the opportunity to study, at first hand, the working of the Federal Government and so to form a background for intelligent and useful citizenship.

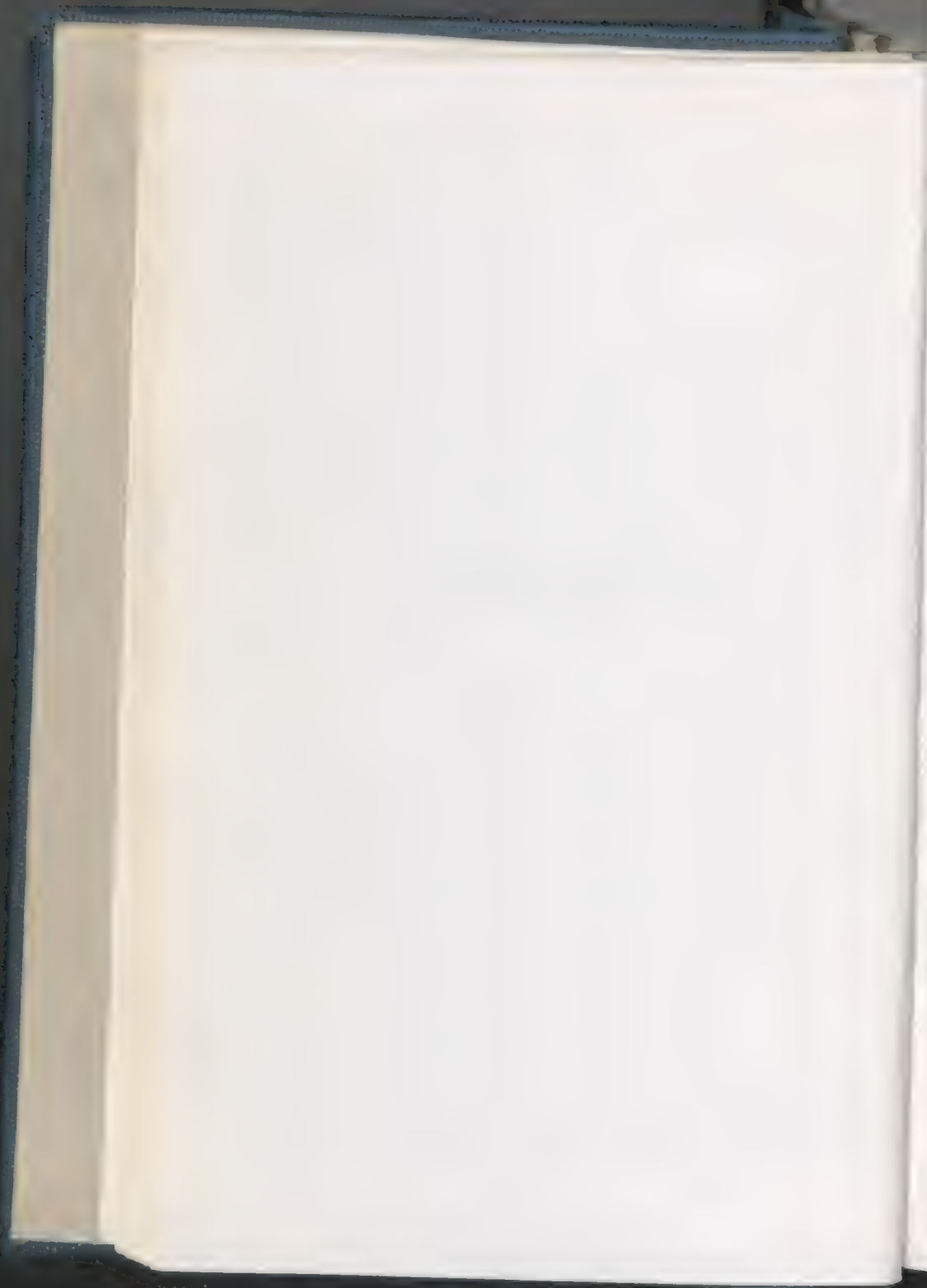
In the departmental libraries of the Federal Government are a multitude of reports made by eminent specialists in all fields of science on the results of study and research in the bureaus, experimental stations, laboratories, museums, and observatories of the Nation.

In addition to the governmental collection the student has access to the research facilities of such scientific and educational groups, whose headquarters are situated in Washington, as the Carnegie Institution, the American Council on Education, the American Council of Learned Societies, the National Academy of Sciences, the National Research Council, the National Education Association, and the National Geographic Society.



THE SUMMER SESSIONS

1955



STAFF OF INSTRUCTION IN THE SUMMER SESSIONS

- John Gage Allee, Jr., A.M., *Assistant Professor of English*
 Antonio Alonso, A.M., *Associate Professor of Spanish*
 Grover LaMarr Angel, A.B., Ed.D., *Lecturer in Education*
 Carville Dickinson Benson, A.B., LL.B., S.J.D., *Professor of Law*
 Wilbur Earle Benson, M.B.A., *Instructor in Accounting*
 Charles Edward Bish, A.B., Ed.D., *Professorial Lecturer in Education*
 Harold Vincent Boisvert, Ph.B. in Commerce, LL.B., *Assistant Professor of Law*
 Robert Whitney Bolwell, Ph.D., *Professor of American Literature*
 Paul William Bowman, Ph.D., *Professor of Biology*
 John Withrow Brewer, Ph.D., *Professor of International Law*
 John Frederick Brougher, A.M., Ed.D., *Professorial Lecturer in Education*
 John Patrick Burke, A.B., LL.B., *Associate Professor of Law*
 Willard Edmund Caldwell, Ph.D., *Associate Professor of Psychology*
 Robert Dale Campbell, Ph.D., *Professor of Geography*
 William Graham Clubb, A.M., *Assistant Professor of French*
 James Harold Coberly, Ph.D., *Associate Professor of American Literature*
 Mary Ellen Coleman, A.B., A.M. in Ed., *Assistant Professor of Education*
 James Coogan, Ph.D., *Assistant Professor of Economics*
 Franklin Dero Cooper, M.S., *Instructor in Hospital Pharmacy*
 Robert McKinney Cooper, Ph.M., J.D., *Associate Professor of Law*
 William Columbus Davis, Ph.D., *Associate Professor of Latin American History*
 James Forrester Davison, A.B., LL.B., LL.M., S.J.D., *Professor of Law*
 Roderic Hollett Davison, Ph.D., *Professor of European History*
 Alan Thomas Deibert, A.M., *Professor of Romance Languages*
 Alton Harold Desmond, Ph.D., *Assistant Professor of Zoology*
 Henry Grattan Doyle, A.M., LL.D., Litt.D., *Professor of Romance Languages*
 Walter David Fackler, A.B., *Assistant Professor of Economics*
 John Theodore Fey, LL.B., M.B.A., J.S.D., *Professor of Law*
 Eric Fischer, Ph.D., *Professorial Lecturer in Geography*
 Francis Raymond Fosberg, Ph.D., *Professorial Lecturer in Geography*
 Bernard Hayman Fox, Ph.D., *Assistant Professor of Psychology*
 James Harold Fox, A.M., Ed.D., *Professor of Education*
 William Thomas Fryer, A.B., LL.B., J.D., *Professor of Law*

- Jean Dresden Grambs, A.M., Ed.D., *Professorial Lecturer in Education*
Wood Gray, Ph.D., *Professor of American History*
Ira Bowers Hansen, Ph.D., *Professor of Zoology*
James Willard Harkness, B.S., Ed.M., *Associate Professor of Chemistry*
Richard Catlin Haskett, Ph.D., *Assistant Professor of American History*
George Francis Henigan, Jr., Ph.M., *Associate Professor of Speech*
Herman Hedberg Hobbs, B.S., *Instructor in Physics*
Averett Howard, A.M., *Associate Professor of English Composition*
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Eva Mayne Johnson, A.M., *Instructor in Psychology*
Everett Herschel Johnson, Ph.D., *Professor of Statistics*
Francis Edgar Johnston, Ph.D., *Professor of Mathematics*
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Wolfgang Herbert Kraus, Dr.Jur., S.J.D., *Associate Professor of Political Science*
Anthony Charles LaBue, Ed.D., *Associate Professor of Education*
Carr Bartleson Lavell, A.M., *Associate Professor of Sociology*
Lubin Poe Leggette, A.M., *Depew Professor of Speech*
Wolfram Karl Legner, Ph.D., *Associate Professor of German*
Frederick Grey Leslie, A.B., LL.B., *Assistant Professor of Law*
Calvin Darlington Linton, Ph.D., *Professor of English Literature*
Howard Rowland Ludden, A.M., *Assistant Professor of Political Science*
William Thomas Mallison, Jr., A.B., LL.B., *Assistant Professor of Law*
Louis Harkey Mayo, B.S., LL.B., J.S.D., *Associate Professor of Law*
Chester Hayden McCall, Jr., A.M., *Instructor in Statistics*
Florence Marie Mears, Ph.D., *Professor of Mathematics*
Robert Hamilton Moore, Ph.D., *Associate Professor of English Composition*
Edith Elizabeth Mortensen, Ph.D., *Associate Professor of Zoology*
James Norman Mosél, A.M., *Associate Professor of Psychology*
Sam Clark Munson, Ph.D., *Associate Professor of Biology*
Nels David Nelson, Ph.D., *Associate Professor of Mathematics*
Ruth Ness, M.S., *Instructor in Chemistry*
Clifton Earl Olmstead, A.B., Th.D., *Associate Professor of Religion*
Herman Israel Orentlicher, A.B., LL.B., *Associate Professor of Law*

- Richard Norman Owens, Ph.D., C.P.A., *Professor of Business Administration*
- John Gilbert Palmer, Ph.D., *Assistant Professor of Botany*
- Calvin Weir Pettit, Ph.D., *Associate Professor of Speech*
- Merle Irving Protzman, Ph.D., *Professor of Romance Languages*
- Lewis Otto Quam, Ph.D., *Professorial Lecturer in Geography*
- James Willis Robb, A.M., *Assistant Professor of Romance Languages*
- Gretchen Louisa Rogers, Ph.D., *Associate Professor of German*
- Blake Smith Root, A.M., Ed.D., *Professor of Education*
- Ralph Windsor Ruffner, A.B., Ed.D., *Professor of Education*
- William Edward Schmidt, Ph.D., *Assistant Professor of Chemistry*
- Wilson Emerson Schmidt, Ph.D., *Assistant Professor of Economics*
- Ernest Sewall Shepard, A.M., *Professor of English Literature*
- George Winchester Stone, Jr., Ph.D., *Professor of English Literature*
- Rafael Supervia, Doctor en Derecho, *Associate Professor of Spanish*
- James Henry Taylor, Ph.D., *Professor of Mathematics*
- Frederick Timberlake, M.B.A., *Instructor in Business Administration*
- William George Torpey, Ph.D., *Lecturer on Public Administration*
- Fred Salisbury Tupper, Ph.D., *Professor of English Literature*
- Edward Felix Turner, Jr., Ph.D., *Assistant Professor of Physics*
- William Lewis Turner, Ph.D., *Associate Professor of English*
- Curtis Edward Tuthill, Ph.D., *Associate Professor of Psychology*
- Robert Corbin Vincent, Ph.D., *Associate Professor of Chemistry*
- Donald Stevenson Watson, Ph.D., *Professor of Economics*
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- Frank Mark Weida, Ph.D., *Professor of Statistics*
- Freel Gardner Welshans, A.B., A.M. in Ed., *Lecturer in Education*
- Warren Reed West, Ph.D., *Professor of Political Science*
- Harland Walter Westermann, A.M., *Assistant Professor of Geography*
- Glen Earl Weston, B.S., LL.B., *Associate Professor of Law*
- David Gover White, B.Chem.Eng., Ph.D., *Assistant Professor of Chemistry*
- Dorothy Willner, A.M., M.S.W., *Lecturer in Sociology*
- Herman Lynn Womack, A.M., *Associate in Philosophy*
- Samuel Nathaniel Wrenn, Ph.D., *Professor of Chemistry*
- Helen Zhemchuzhnaya Yakobson, B.S., *Assistant Professor of Russian*

THE SUMMER SESSIONS

The work of the Summer Sessions has been planned to meet the needs of full- and part-time students.

During the summer of 1955, courses are offered in the Junior College, Columbian College (the senior college), the Law School, the School of Education, the School of Government, and the Division of Air Science.

ADMISSION

An applicant for admission must obtain from the Office of the Director of Admissions an application blank which he must fill out completely and return with the application fee of \$3. A recent photograph, with signature, of the applicant must be attached to the blank.

ENTRANCE REQUIREMENTS

The Student Seeking a Degree

An applicant from a secondary school must send the high school record form furnished by the University to his high school principal, with the request that the principal fill out the form and mail it direct to the Office of the Director of Admissions.

An applicant who has previously attended an institution of higher learning should request the registrar of that institution to mail direct to the Office of the Director of Admissions a transcript of his record. If he has attended more than one such institution he must request the registrar of each institution to send to the Office of the Director of Admissions a transcript of his record, *even though credits were not earned*, together with an honorable dismissal.

Entrance requirements are stated in this bulletin under the various colleges, schools, and divisions.

The Student Not Seeking a Degree

Students 21 years of age or over who are not interested in working for a degree in this University may be considered for admission to the Division of University Students to take courses for which they have adequate preparation, as evidenced by previous scholastic records.

In special instances, with the permission of the instructor, a person who has been admitted to the University may be registered as an auditor in a class without being required to take active part in the exercises or to pass examinations, but no academic credit will be allowed for such

attendance. Students in good standing and matriculated for degrees in other institutions who wish to take certain courses in this University will be admitted to the Division of University Students for the summer only, to the extent that the facilities permit. In such cases transcripts of record are not required.

REGISTRATION

Before a student may register he must have satisfied the Office of Admissions that he is qualified to enter the University.

A student previously matriculated in the University but not in attendance during the term preceding this registration must file an application for readmission in advance of registration.

For registration, students should report to the Office of the Registrar,* Building C, 2029 G Street NW., between 9:00 A.M. and 7:00 P.M., on the dates stated in the Calendar.

CHANGES IN PROGRAM OF STUDY

Changes in programs of study may be made only with the permission of the adviser or major professor and the dean or director of the college, school, or division concerned.

FEES AND FINANCIAL REGULATIONS

By authorization of the Board of Trustees, the following fees have been adopted:

TUITION FEES

For each credit hour for which the student registers except work in the Law School, work toward the Master's degrees in Engineering, and work taken by a candidate for a Doctor's degree	\$ 15.00
For each credit hour for which the student registers in the Law School	17.00
For the degree of Doctor of Philosophy, Doctor of Education, or Doctor of Business Administration	
For work leading to and including the Council Fellowship or General examination	45.00
For work leading to and including the final examination	450.00

* Registration for the Law School is conducted in Stockton Hall, 720 Twentieth Street, NW.
 † Payment of tuition for the Master's thesis entitles the candidate during the matriculating year to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unaccepted, an additional successive academic year may be required without further tuition payment. If the preparation of the thesis extends beyond the second academic year, it must be registered for again, and tuition paid on the same basis as for a renewed course.

‡ This fee does not cover the cost of tuition for elementary courses (numbered 1 to 100).
 § When a limited schedule is carried which extends the time of either the preparation period or the examination period to more than one year, the proportionate part of the charge may be fixed by the Treasurer.

For the degree of Doctor of Juridical Science:	
For work leading to and including the final examination *	450.00
For the degree of Master of Engineering Administration:	
For work leading to and including the Comprehensive Problem and the Comprehensive Examination	500.00
For the degree of Master of Science in Engineering:	
For work leading to and including the Comprehensive Examination	550.00

ADDITIONAL COURSE FEES

In certain courses additional fees such as laboratory and material fees are charged as indicated in the course descriptions. These fees are due with the tuition fee for the course. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee, the individual student will be required to pay such additional charges as are determined by the department concerned.

GRADUATION FEES

Wherein the degree of Associate in Arts is granted	10.00
Wherein a degree other than the Associate in Arts degree is granted	80.00

FEE FOR BINDING MASTER'S THESIS	5.00
FEE FOR PRINTING SUMMARY OF DOCTORAL DISSERTATION	75.00

SPECIAL FEES

Application fee, charged each applicant for admission, non-refundable	3.00
Scholastic aptitude test fee (when required for admission)	3.00
Late registration fee, charged each student who fails to register within the designated period	5.00
Withdrawal fee, charged each student who preregisters and withdraws prior to the regular registration	5.00
Service fee, charged each student for late payment of tuition (see "Payment of Fees")	1.00
Reinstatement fee, charged each student who is reinstated after suspension for delinquency in fees	5.00
For each examination to qualify for advanced standing and for each special examination	5.00
Laboratory checkout fee, charged each student in chemistry and pharmacy courses who fails to check out of the laboratory by the time set by the instructor	2.00
Transcript fee, charged for each transcript of record after the first	1.00

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record, if and when desired; (2) the services of the Placement Office; (3) the use of the University library facilities, except as otherwise designated; (4) medical attention and hospital services described below. These privileges, with the exception of the issuance of transcripts, cease when the student withdraws or is dismissed from the University.

Medical and Hospital Services.—These services include: (1) three visits by the University physician or surgeon, office or residence (District of Columbia) in any one illness, exclusive of a specialist, surgical opera-

* When a limited schedule is carried which extends the time of either the preparation period or the examination period to more than one year, the proportionate part of the charge may be fixed by the Treasurer.

tion, laboratory, or X-ray examinations; (2) hospitalization, including board and nursing in the University Hospital for not more than one week during any twelve-month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration.

The student is allowed, if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

This medical benefit does not apply to illness or disability incurred previous to the University term or prior to payment of tuition fees.

PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street NW. No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each session are due in advance at the time of registration.

An auditor pays all fees chargeable to the student registered for credit except the late-registration fee.

WITHDRAWALS AND REFUNDS

Registrations are for the session, and no refunds or rebates are allowed, unless the registration is in advance and the course is dropped before the day of registration for the session involved.

A student who preregisters and withdraws prior to the date of regular registration will be charged a withdrawal fee of \$5.

In no case will any part of the initial payment of tuition be refunded because of nonattendance upon classes.

Payments apply only to the session for which registration charges are incurred, and in no case will these payments be credited to another session or term.

Any student in chemistry who fails to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a laboratory check-out fee of \$2. A student dropping a course before the end of the session must check out of the laboratory at the next scheduled laboratory period.

No permission to withdraw and no certificate for work done will be given a student who has not a clear financial record.

UNIVERSITY REGULATIONS

Students in the Summer Sessions are subject to, and are expected to familiarize themselves with, the University regulations as stated in the general catalogue.

Academic Credit.—The Summer Sessions are an integral part of the University. Academic credit for completed work will be given toward the appropriate degrees in the various colleges and schools of the University in accordance with their separate regulations and requirements.

Residence.—Summer Sessions work may be counted in residence but the candidate for a degree must satisfy the residence requirements of the school or college concerned as stated in the general catalogue.

Amount of Work.—No full-time student may take more than nine credit hours of work during the eight-week session; no employed student, more than six hours.

In the Law School the maximum amount of work that may be taken in both sessions by a full-time student is sixteen credit hours; by an employed student, ten credit hours.

The right is reserved to drop any student whenever, in the interest of the student or the University, the Faculty deems it advisable to do so.

The University is not responsible for the loss of personal property belonging to a student.

The University and its various colleges, schools, and divisions reserve the right to modify or change the requirements, rules, and fees of the University. Such regulations shall go into force whenever the proper authorities may determine and shall apply to every student of the University.

Detailed information concerning curricula; courses offered; admission; scholarship requirements of the individual colleges, schools, and divisions; and requirements for degrees may be obtained from the general catalogue, which is available on request at the Office of the Director of Admissions.

VETERANS EDUCATION

The George Washington University is approved to provide training to veterans under the provisions of Public Laws 346, 16, 550, and 894. The Office of Veterans Education, 2029 H Street NW., Building Q, operates as a service bureau for veterans interested in studying at the University and acts in a liaison capacity between the University and the Veterans Administration. Here information may be obtained concerning the educational program of the University and the procedure for securing educational benefits under the GI bills. Veterans residing in the Washington area will often find it to their advantage to seek advice at the Office of Veterans Education before applying to the Veterans Administration for a Certificate.

**PUBLIC LAW 346
(WORLD WAR II GI BILL)**

At least thirty days prior to registration the veteran desiring to attend under this GI Bill should apply to the Veterans Administration, Veterans Benefits Office, Munitions Building, 20th Street and Constitution Avenue, NW., Washington 25, D.C., for a Certificate of Eligibility and Entitlement, for presentation to the Office of Veterans Education at the time of registration. Veterans who have attended another institution under the GI Bill must obtain a Supplemental Certificate from the Veterans Administration for presentation to this University at registration. With few exceptions, veterans are required to maintain continuity in course by taking at least one subject each fall term and each spring term. In most cases veterans who withdraw from the University during the fall or spring term will be considered to have terminated their courses and thus forfeited further educational benefits. Any veteran who has interrupted his training during a term or for an entire term must secure authorization to reenter from Veterans Administration to be presented at the time of registration.

**PUBLIC LAW 550
(KOREAN GI BILL)**

In order to be eligible for the benefits under this GI Bill, a veteran must have been in service since June 27, 1950, and must no longer be on active duty. For further information concerning these benefits, it is suggested that he consult the Veterans Administration, Veterans Benefits Office, Munitions Building, 20th Street and Constitution Avenue NW., Washington 25, D.C. At least thirty days prior to registration the veteran desiring to attend under this GI Bill should apply to the Veterans Administration for a Certificate for Education and Training, which should be presented at the time of registration. A photostatic copy of separation papers must accompany this original application. Veterans who have attended another institution under any GI bills must obtain a Supplemental Certificate from the Veterans Administration for presentation to this University at registration.

**PUBLIC LAWS 16 AND 894
(VOCATIONAL REHABILITATION)**

Disabled veterans desiring vocational rehabilitation under either GI Bill should apply to the Veterans Administration, Veterans Benefits Office, Munitions Building, 20th Street and Constitution Avenue NW., Washington 25, D. C., for approval of their training objective at least sixty days prior to registration.

STUDENT LIFE

SOCIAL AND RECREATIONAL PROGRAM OF THE UNIVERSITY

The summer social and recreational program includes regularly scheduled social, square, and folk dances on Lisner Terrace. For those who would like instruction and practice in dance, teaching sessions are provided. Get-acquainted teas and a carnival are also included in the program.

During the summer notices of the many recreational and social opportunities offered in the Capital will be posted on a bulletin board in the Student Union.

LIVING ACCOMMODATIONS

Women Students.—The Hattie M. Strong Residence Hall provides single rooms at \$35 a month and double rooms at \$30 a month a person. Meals are served at the Student Union. Admission to the University does not include dormitory reservation. A separate application for a room should be made well in advance. Forms for application, together with detailed information, may be obtained from the Director of Activities for Women, Woodhull House, 2033 G Street NW.

Girls under the age of twenty-one who are enrolled for six or more credit hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory, except with persons approved by the Director of Activities for Women.

Men Students.—Welling Hall provides double room facilities for 102 students. Rooms rent for \$24 a month a person. Meals are served at the Student Union. Application forms for room reservation may be obtained from the Director of Activities for Men, Building R, 2027 H Street NW.

Information concerning private rooming and boarding facilities near the University, for women students twenty-one years of age or older and for men students, may be obtained at the Housing Office. The reservation of rooms in private houses must be made by students.

THE COLLEGES, SCHOOLS, AND DIVISIONS

THE COLLEGES, SCHOOLS, AND DIVISIONS

Information concerning specific requirements for degrees is omitted from this bulletin. For such information, the student is referred to the general catalogue.

THE JUNIOR COLLEGE

The Junior College includes the first two years of college work. Its curricula are intended to continue the studies of a general cultural nature begun in secondary school, and to lay a foundation for the more specialized work which is to follow.

The Junior College also provides the preprofessional work required for admission to the schools of Pharmacy, Education, and Government, and the first two years of the preprofessional work required for admission to the schools of Medicine and Law.

In addition it provides a two-year terminal curriculum in Secretarial Studies and a two-year terminal curriculum in Accounting for students who wish strictly vocational training in these subjects.

THE DEGREE OF ASSOCIATE IN ARTS

The Junior College offers work leading to the degree of Associate in Arts.

ENTRANCE REQUIREMENTS

An acceptable certificate of graduation from an accredited secondary school is required. The acceptability of the certificate depends upon the student's character and the quality of his work.

COLUMBIAN COLLEGE

Columbian College, the senior college of liberal arts and sciences, comprises the work of the junior and senior years and the Master of Arts and Master of Science disciplines.

THE DEGREES

Columbian College offers work leading to the following degrees: Bachelor of Arts, Bachelor of Science, Master of Arts, and Master of Science. In cooperation with the School of Medicine, Columbian College offers work leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.

UNDERGRADUATE MAJORS

Curricula leading to the degree of Bachelor of Arts are available in the following major fields:

American Thought and Civilization	Latin American Civilization
Art:	Mathematics
Appreciation	Philosophy
Drawing and Painting	Physics
Biology	Political Science
Botany	Psychology
Chemistry	Religion
Economics	Sociology
English Literature	Spanish American Literature
French Literature	Spanish Literature
Geography	Speech
Germanic Languages and Literatures	Statistics
History	Zoology
Journalism:	
News-Editorial	
Public Relations	

Curricula leading to the degree of Bachelor of Science are available in the following major fields:

Biology	Physics
Botany	Statistics
Chemistry	Zoology
Mathematics	

GRADUATE FIELDS

Graduate work leading to the degree of Master of Arts or Master of Science is offered in the following fields:

American Literary and Cultural	Latin American Civilization
History	Mathematics
Anatomy	Pharmacology
Bacteriology	Philosophy
Biochemistry	Physics
Biology	Physiology
Botany	Political Science
Chemistry	Psychology
Economics	Sociology
English and American Literature	Spanish American Literature
English Literature	Spanish Literature
French Literature	Statistics
Geography	Zoology
History	

In addition, programs can be arranged in combined fields subject to the approval of the division or divisions concerned.

ENTRANCE REQUIREMENTS

For the Bachelor's degrees, the degree of Associate in Arts based on the appropriate curriculum in the Junior College, or the equivalent, is required. Scholarship requirements may be somewhat higher than those for graduation from the Junior College. For the Master's degrees, an approved Bachelor's degree from an accredited institution and a transcript of studies previously pursued, showing appropriate distribution of courses and a superior quality of work in the major field, are required.

THE GRADUATE COUNCIL

The Graduate Council offers work leading only to the degree of Doctor of Philosophy. Because the basis for work under the Graduate Council is primarily creative research, regular study in specific courses is considered quite incidental and is therefore not emphasized in connection with the curricula of the Summer Sessions. A student wishing to work under the disciplines of the Graduate Council will consult the Chairman of the Graduate Council for information concerning credentials and candidacy.

A pamphlet describing details of the Graduate Council program, together with a current list of fields of research offered by the Council, will be sent upon request by the Office of the Graduate Council.

THE LAW SCHOOL

The Law School offers work leading to the following degrees: Bachelor of Laws, Juris Doctor, Master of Laws, Master of Comparative Law, and Doctor of Juridical Science.

ENTRANCE REQUIREMENTS

For the Degree of Bachelor of Laws.—A Bachelor's degree awarded upon completion of a four-year course in an approved college or university is required. All pre-legal work must be of a satisfactory quality and distribution. No student will be admitted who has been in attendance at another law school and who is ineligible to return to that school in good standing. From the applicants, a selection will be made by the Committee on Admissions.

The Juris Doctor degree is conferred as a recognition of completion with high rank of the full course, including experience in research and legal authorship. A student does not register as a candidate for this degree until his last year in the Law School.

For the Degree of Master of Laws.—A Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree from a member school of the Association of Amer-

ican Law Schools are required. Candidates for admission must have attained an average grade on all work done for the Bachelor of Laws degree equivalent to the relative position of a *B* average in the standards of grading at this Law School, except that, in the discretion of the Committee on Graduate Studies, applicants otherwise eligible may be admitted on proof of experience and attainment as an alternative.

For the Degree of Master of Comparative Law.—The following are required: (1) the successful completion of and graduation from a course in arts, philosophy, letters, or sciences, equivalent to graduation from a gymnasium, lycee, or lyceo (junior college); and (2) graduation in law from a recognized foreign university where training was in civil law.

For the Degree of Doctor of Juridical Science.—The following are required: (1) the degree of Juris Doctor from this Law School; or (2) the degree of Bachelor of Arts from an approved college, the degree of Bachelor of Laws or the equivalent, earned with high rank, from a member school of the Association of American Law Schools, and outstanding capacity for scholarly work in the field of law.

Unclassified Students.—A person who is in good standing as a degree candidate in another law school which is a member of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student in order to earn credits for transfer to the other law school.

A person who is a member of the bar or a person, not a member of the bar, who is a graduate of a member school of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student.

Unclassified students are required to participate in the work of the course and take examinations. Courses taken by unclassified students will not be credited toward degrees at this Law School.

Continuing Legal Education Students.—A simplified admission and registration procedure is provided for members of the bar desiring to register as continuing legal education students to take courses on a non-credit basis. Members of the bar desiring to register as degree candidates or as unclassified students should file the regular application for admission form.

THE SCHOOL OF EDUCATION

The School of Education prepares teachers, supervisors, and administrators for educational service and offers opportunities to teachers of experience to extend their education. The schedule of courses is arranged to meet the needs of employed students as well as those able to devote full time to their studies. It offers both graduate and undergraduate work.

THE DEGREES

The School of Education offers work leading to the following degrees: Bachelor of Arts in Education, Bachelor of Science in Home Economics, Bachelor of Science in Physical Education, Master of Arts in Education, and Doctor of Education.

ENTRANCE REQUIREMENTS

For the Bachelor's Degrees.—The satisfactory completion of two years of approved college work, or graduation from an approved two-year normal school, or the equivalent, is required.

For the Master's Degree.—A Bachelor's degree from an accredited college, or the equivalent, and the approval of the Committee on Admissions and Advanced Standing are required.

For the Doctor's Degree.—A Master's degree from an accredited college, or the equivalent, and the approval of the Faculty of the School of Education are required.

THE SCHOOL OF GOVERNMENT

THE DEGREES

The School of Government offers work leading to the following degrees: (1) Bachelor of Arts in Government with a major in Foreign Affairs, Accounting, Business Administration, or Business and Economic Statistics; (2) Master of Arts in Government with a major field in Foreign Affairs, Economic Policy, Accounting, Business and Economic Statistics, Counseling, or Psychometrics; (3) Master of Arts in Public Administration with a major in General Administration or Governmental Fiscal Administration; (4) Master of Arts in Personnel Administration; (5) Master of Business Administration; (6) Doctor of Business Administration.

ENTRANCE REQUIREMENTS

For the Bachelor's Degree

Bachelor of Arts in Government.—An Associate in Arts degree based on the *Foreign Affairs, Accounting, Business Administration, or Statistics* curriculum in the Junior College, or the equivalent, and a quality-point index of 2.00 for the first two years' work are required.

For the Master's Degrees

A Bachelor's degree from an accredited college or university is required. A student from an unaccredited institution may be admitted at the discretion of the Dean's Council, but will be required to take such extra work above the minimum requirements as may be prescribed.

Students admitted to candidacy must have attained a quality-point index of 3.00 (a *B* average) in their undergraduate major. Applicants whose scholastic average is below 3.00 in their major, or who lack prerequisite courses, may be referred to the Division of Special Students to make up the deficiency.

Master of Arts in Government.—The applicants' undergraduate program must have included prerequisite courses, corresponding to undergraduate majors at this University, for the chosen field of graduate study.

Master of Arts in Public Administration.—An undergraduate major in a social science field appropriate to the chosen field of advanced work in public administration is required.

Master of Arts in Personnel Administration.—An undergraduate major in a social science or education, with the appropriate courses in psychology is required.

Master of Business Administration.—An acceptable undergraduate major in Business Administration or the equivalent is required. Applicants who are deficient in such course work may be admitted and will be required to make up deficiencies over and above the normal Master of Business Administration program.

For the Degree of Doctor of Business Administration

A Master's degree in Business Administration or a related field, or the equivalent, and proficiency in Statistics and Accounting to the satisfaction of the Committee on Doctoral Studies are required.

COLLEGE OF GENERAL STUDIES

The College of General Studies offers off-campus credit and non-credit courses in any field in which there is sufficient demand and for which instructional facilities can be made available. These courses will meet at the time and place most convenient for the students enrolled and may begin at any time of the year.

The College also provides degree-granting divisions for mature adults whose background and experience is such that they should be matriculated in a division designed to meet their special needs.

The Division of Community Services provides a program of community educational services such as the George Washington University Reading Clinic and the Government Intern Scholarship Program.

ENTRANCE REQUIREMENTS

Off-Campus Credit Courses.—A simplified procedure for admission and registration in off-campus courses is conducted at the first meeting of the class. Transcripts of previous academic work are not required.

Registration is restricted to those whose qualifications would indicate that they are able to carry the course successfully. Admission to an off-campus course does not constitute admission to degree candidacy in the University.

Off-Campus Non-Credit Courses.—In general, off-campus non-credit courses will be open to any individual interested in enrolling. When a non-credit course is organized at the request of some particular agency or group, admission may be restricted to the students recommended by the sponsoring organization. A limit on the size of classes may have to be imposed in order to maintain the quality of instruction.

THE DIVISION OF UNIVERSITY STUDENTS

The Division of University Students makes the work of the University, in its several colleges and schools, accessible to students 21 years of age or over who are not working toward a degree in this University.

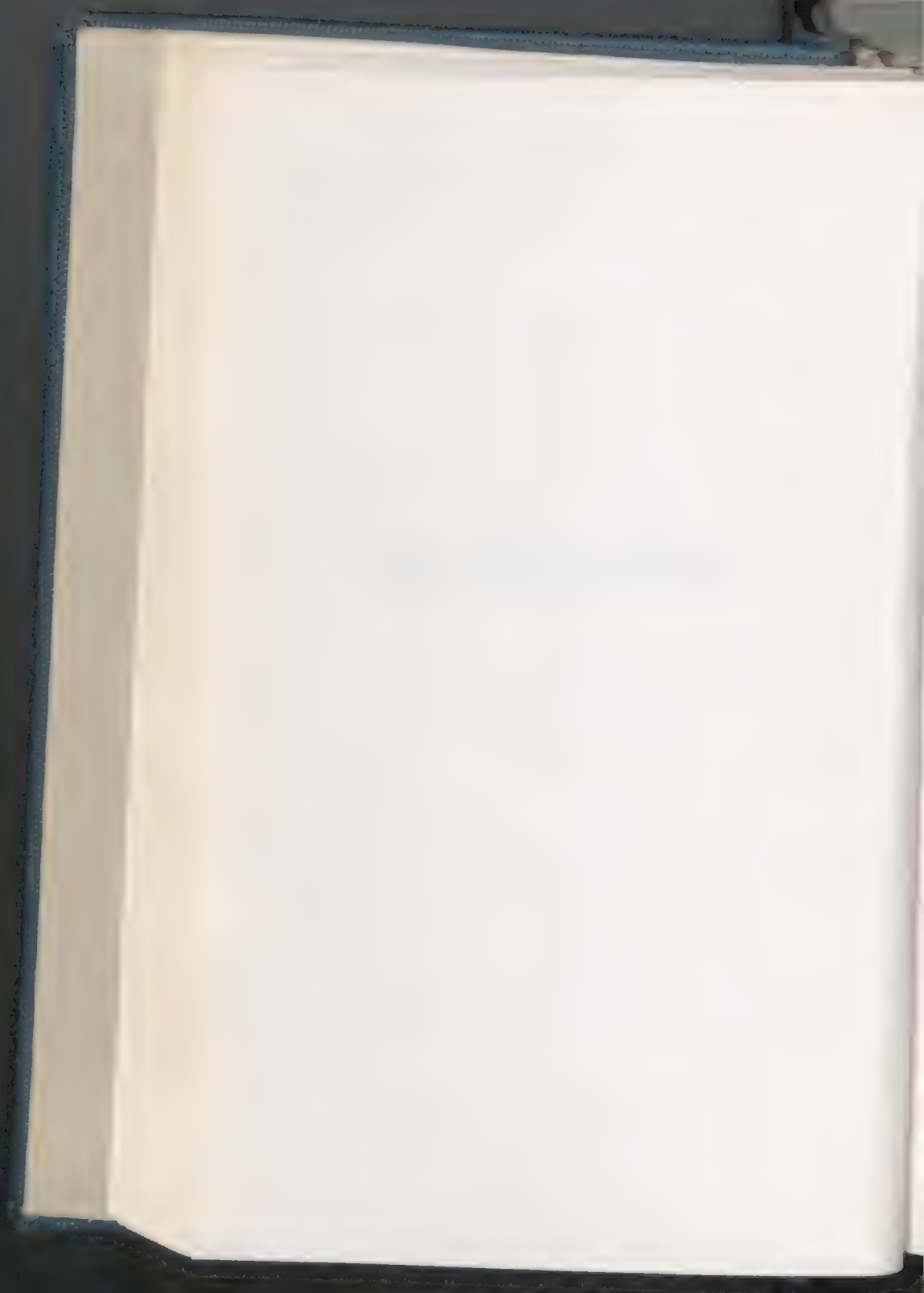
Candidates for degrees in other colleges and universities attending the Summer Sessions of the University are registered in the Division of University Students.

Adequate preparation to undertake the desired courses is required.

THE DIVISION OF SPECIAL STUDENTS

This is a non degree-granting division of the University in which the Director of Admissions may authorize the placement of students in the process of making up entrance deficiencies to degree-granting colleges and schools of the University.

COURSES OF INSTRUCTION



COURSES OF INSTRUCTION

EXPLANATION OF COURSE NUMBERS

First-group courses.—Courses numbered from 1 to 100, are planned for the student in the freshman or sophomore year. With the approval of the adviser and the dean, they may also be taken by a junior or senior. In certain instances, they may be taken by a graduate student to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be credited toward a higher degree.

Second-group courses.—Courses numbered from 101 to 200, are planned for the student in the junior or senior year. They may be credited toward higher degrees only when registration for graduate credit has been approved at the beginning of the course by the dean responsible for the graduate work and by the officer of instruction, and when the completion of additional work has been certified by the officer of instruction.

Third-group courses.—Courses numbered from 201 to 300, are planned primarily for the graduate student. They are open, with the approval of the officer of instruction, to the qualified senior; they are not open to the Junior College student.

In the Law School, first-year courses are numbered from 101 to 200; second-year courses, from 201 to 300; third-year courses, from 301 to 400; and graduate courses, from 401 to 500.

INDICATION OF THE AMOUNT OF CREDIT

The number of hours of credit given for the satisfactory completion of a course is in most cases indicated in parentheses after the name of the course.

The University reserves the right to change or withdraw any of the courses of instruction listed.

ACCOUNTING

- 1 *Introductory Accounting* (3) Kennedy
Basic principles underlying accounting records used by single proprietorships; preparation of the work sheet and financial statements. 8:10 A.M.
- 1-2 *Introductory Accounting* (3-3) Benson
Study of basic principles underlying accounting records used by single proprietorships, partnerships, and corporations; preparation of the work sheet and financial statements; introduction to cost accounting and to valuation and income determination problems. Prerequisite to Accounting 2: Accounting 1 or permission of the instructor. Accounting 2 begins July 18. 7:10 to 9:00 P.M.
- 101 *Cost Accounting* (3) Benson
Study of the theory and purpose of industrial cost accounting; treatment of the systems of cost control and determination, and the analysis and interpretation of cost data. Emphasis will be on job order cost accounting. Prerequisite: Accounting 1-2. 9:15 A.M.
- 111 *Financial Statement Analysis* (3) Kennedy
Methods and techniques of preparing, analyzing, and interpreting financial statements for the guidance of operating executives, directors, stockholders, and creditors; determination and interpretation of trends and ratios. Prerequisite: Accounting 1-2. MTWTh 7 to 8:15 A.M.
- 132 *Accounting Theory* (3) Kennedy
Study of the development of basic accounting principles and concepts with special reference to the current thought expressed by the American Institute of Accountants and the American Accounting Association. Prerequisite: six hours of accounting. TTh 7:15 to 9:25 P.M.
- 155 *Business Budgeting* (3) _____
Study of the principles, preparation, and administration of a business budget, with emphasis on the importance of the budget to management. Prerequisite: Accounting 1-2. MTWTh 5:55 to 7:00 P.M.
- 275 *Internal Control and Auditing* (3) _____
Study of internal accounting controls; review and appraisal of accounting systems and procedures; study and evaluation of managerial policies with respect to their effectiveness and profitability. Emphasis is placed upon the use of internal control and auditing as an aid to management. Prerequisite: Accounting 171 or permission of the instructor. MW 7:15 to 9:25 P.M.

ART

- 71 *Introduction to the Arts in America* (3) Kline
Painting, architecture, and sculpture in America during the Colonial and Republican periods. 5-7 P.M.

- 72 *Introduction to the Arts in America* (3) Kline
Painting, architecture, and sculpture in America during the mid-19th and 20th centuries. 6:10 P.M.

BIOLOGY

- 1-2 *Survey in Biology* (3-3) Munson, Bowman
A review of the plant and animal kingdoms, with emphasis upon the interdependence of living things and their relations with their environments. Introduction to evolution and heredity, public health, and conservation of natural resources. Material fee, \$5 for each half. Nine-week term. Biology 1 is not prerequisite to Biology 2. Biology 2 begins July 21 and ends August 22. Lectures, laboratories, and field trips. 1:10 to 5:00 P.M.
- 212 *Research in Cytology* (arr.) Bowman
Individual problems for advanced students interested in this field. Hours and credits to be arranged.
- 299-300 *Thesis* (3-3) Bowman

BOTANY

- 1 *Structure and Functions of the Flowering Plant* (3) Palmer
The typical plant as a working mechanism, with emphasis on the general biological significance of plant physiology. Material fee, \$5. Lecture—TThF 11:10 A.M.; Laboratory—MW 10:10 to 12:00 A.M.
- 2 *Survey of the Plant Kingdom* (3) Palmer
Study of the different kinds of plants, with emphasis on the evolution of the plant kingdom; practice in identifying flowering plants. May be taken concurrently with Botany 1. Material fee, \$5. Lecture—MW 12:10 P.M.; F 11:10 A.M.; Laboratory—TThF 11:10 A.M. to 1:00 P.M.
- 295 *Research* (arr.) The Staff
Time, credits, and fees to be arranged.
- 299-300 *Thesis* (3-3) The Staff

BUSINESS ADMINISTRATION

- 102 *Business Management* (3) Timberlake
The management movement, organization of an enterprise, principles of management and their application to various departments of an enterprise. 6:10 P.M.
- 106 *Problems in Personnel Management* (3) Owens
Principles of human relations illustrated by cases drawn from business and industry. Prerequisite: Business Administration 1-5. 7:10 P.M.
- 109 *Office Management* (3) Johnson
Organization and layout of an office, use of office machines and appliances, planning and execution of work, supervisory problems. MTWThF 5:55 to 7:00 P.M.

- 131 *Business Finance* (3) _____
Basic problems involved in the financing of business enterprises.
Prerequisite: Accounting 1-2. 7-10 P.M.
- 138 *Investments* (3) Timberlake
Analysis of factors of investment credit with application to different types of investments, proper selection of investments of various classes of investors, regulation. Prerequisite: Accounting 1-2. 8-10 A.M.
- 197 *Introduction to Business Policy* (3) Owens
Significance of business policies in management, formulation of policies, relation of various organization levels to policy making, some significant policies. Readings and problems. Admission by permission of the instructor. 9-11 A.M.
- 291 *Seminar in Business Administration* (3) Owens
Research on various phases of management, including business, industrial, and personnel management. TTh 8:10 to 10:00 P.M.

CHEMISTRY

- †11-12 *General Chemistry* (4-4) Harkness, White
Chemistry 11-12 is an elementary course in general chemistry. Prerequisite: one year of high school algebra. Students with credit for one term of general chemistry (college level) may enter Chemistry 12 on July 21. Laboratory fee, \$15 for each half. Nine-week term ending August 22. 8:30 A.M. to 1:20 P.M.
- 21 *Qualitative Inorganic Analysis* (4) Schmidt
Theoretical and practical study of methods of separating and identifying the more common cations and anions using semi-micro techniques. Prerequisite: Chemistry 12. Laboratory fee, \$15. Eight-week term. TWThF 1:10 to 5:00 P.M.
- †151-52 *Organic Chemistry* (4-4) Wrenn, Ness
Chemistry of the compounds of carbon. Credit is not given for Chemistry 151 until Chemistry 152 is completed. Prerequisite: Chemistry 21. Chemistry 151—laboratory fee, \$9. Chemistry 152 laboratory fee, \$15. Students who have credit for Chemistry 151 may enter Chemistry 152 on July 21. Nine-week term ending August 22. 8:30 A.M. to 1:20 P.M.
- 295-96 *Research* (arr.) The Staff
Research on problems approved by the Staff. Open to qualified students with advanced training. Laboratory fee, \$6 a credit hour. Hours and credits to be arranged.
- 299-300 *Thesis* (3-3) The Staff
Laboratory fee, \$15 a term. Hours to be arranged.

* A dagger preceding an odd-numbered course indicates that it is the first half of a full-year course, the second half of which must be completed before credit is allowed.

ECONOMICS*

- 1 *Principles of Economics** (3) Coogan
Survey of major economic institutions and economic problems in contemporary society. Section A: MTWTh 7:55 to 9:00 A.M.; section B: MTWTh 5:55 to 7:00 P.M.
- 2 *Principles of Economics* (3) Fackler
Continuation of Economics 1. Section A: 1:10 A.M.; section B: 7:10 P.M.
- 101 *Economic Theory* (3) Watson
Introduction to formal economic theory, advanced analysis of demand and supply relations. Section A: MTWTh 7:55 to 9:00 A.M.; section B: MTWTh 5:55 to 7:00 P.M.
- 102 *Economic Theory* (3)
Continuation of Economics 101. 7:10 P.M.
- 121 *Money and Banking* (3) Coogan
Theory of money, credit, and banking; commercial banking and the Federal Reserve System; other financial institutions; international aspects of money; current financial problems 9:10 A.M.
- 181 *International Economics* (3) Schmidt
Survey of world economics, theory of international trade, analysis of international economic problems, and the international organizations. 1:10 A.M.
- 182 *International Economics* (3) Schmidt
Continuation of Economics 181. MTWTh 5:55 to 7:00 P.M.
- 251 *Theories of Economic Development* (3)
Growth and change in economic activity, capital accumulation, innovations in technology and business organization. TTh 7:10 to 9:00 P.M.
- 272 *Applied Economic Analysis*† (3) Watson
Introduction to general equilibrium theory, game theory, linear programming. Cost and effectiveness concepts. Admission by permission of the instructor. TTh 1:10 to 3:12 P.M.
- 276 *Principles and Procedures of Target Analysis*† (3)
Values and economic vulnerability of target systems. Criteria of selection. Cost of operation. Admission by permission of the instructor. Time to be arranged.
- 284 *United States Foreign Economic Policy* (3) Schmidt
Analysis of foreign and economic, international, commercial, and monetary policy of the United States, United States and international economic organization. MW 7:10 to 9:00 P.M.

* Economics 102 is prerequisite to all other courses in Economics.

† Primarily for students in the Military Economics and Finance Program.

- 297-98 *Thesis* (School of Government majors) (3-3) The Staff
 299-300 *Thesis* (Columbian College majors) (3-3) The Staff

EDUCATION

PRE-SESSION

June 13 to July 1

- 109 *Learning and Teaching* (3) Ruffner
 For the general student as well as the prospective teacher. Nature of learning approached through the study of actual classroom situations. 9:00 to 12:00 A.M.; small group discussions, conferences, and field work in afternoon.
- 219 *Recent Developments in Elementary Education* LaBue (3)
 For experienced teachers. New areas of emphasis, changing techniques of working with children, curriculum trends, review of recent literature 9:00 to 11:00 A.M.; conference hour, 11:10 A.M.; small group discussions and field work in the afternoon.
- 255 *Secondary Education* (3) Root
 Current proposals for the reorganization of secondary education. 9:00 to 11:00 A.M.; conference hour, 11:10 A.M.; small group discussions and field work in the afternoon.

SPECIAL SIX-WEEK SESSION

First Half—July 5 to July 22

- 110 *Learning and Teaching* (3) Ruffner
 For the general student as well as the prospective teacher. Nature of teaching approached through the study of actual classroom situations. 9:00 to 12:00 A.M.; small group discussions, conferences, and field work in the afternoon.
- 116 *Elementary School Social Studies* (3) Welshans
 For experienced teachers. Content, materials, and methods. 9:00 to 11:00 A.M.; conference hour, 11:10 A.M.; small group discussions and field work in the afternoon.
- 256 *Secondary Education* (3) Root
 Current problems in each of the subject-matter fields. 9:00 to 11:00 A.M.; conference hour, 11:10 A.M.; small group discussions and field work in the afternoon.

Second Half—July 25 to August 12

- 121 *Society and the School* (3) Angel
 For the general student as well as the prospective teacher. The local, national, and international roles of education; cooperation of the

school with other community agencies. 10:00 to 12:00 A.M.; small group discussions, conference, and field work in the afternoon.

- 225 *Elementary School Reading* (3) Coleman
Developmental and remedial approaches to reading problems. Demonstrations of diagnostic and corrective techniques used in the Reading Clinic. 9:00 to 11:45 A.M.; conference hour, 11:45 A.M.; small group discussions and field work in the afternoon.

- 231 *Secondary School Classroom Procedures* (3) Bish
Survey of current classroom practice with particular attention to teaching aids, review of recent literature. 9:00 to 11:00 A.M.; conference hour, 11:10 A.M.; small group discussions and field work in the afternoon.

Full Period—July 5 to August 12

- 216 *Education of the Slow Learner* (3) LaBue
Identification, nature, and needs of the slow learner at the elementary and junior high school level. Emphasis upon curriculum development designed for regular classroom teachers who must provide special methods and materials in the education and guidance of the slow learner. Also of interest to special class teachers and administrators. 2:15 P.M.; conference hours, T 4:10 P.M. and Th 3:10 P.M.

- 217 *Contemporary Problems in Education* (3) Jarman
Designed to help students formulate a personal philosophy of education. 9:10 A.M.; conference hours, T 10:20 A.M. and Th 11:30 A.M.

- 229 *Administration of Elementary Education* (3) LaBue
For experienced teachers and administrators. Administration as a means of achieving instructional objectives; organizing learning and teaching activities; managing pupil personnel and special services; handling supplies and equipment; maintaining the building; integrating school and community life. Emphasis upon guide lines to action. 11:30 A.M.; conference hours, M 10:20 A.M. and W 1:00 P.M.

- 243 *Human Relations in the Classroom* (3) Grambs
Principles and practices involved in interpersonal relationships between learner and teacher and among learners. TTh 6:40 to 9:00 P.M.; conference hours, 6:00 P.M.

- 251 *Guidance in Secondary Schools* (3) Brougher
Scope, needs, organization of the program; services to students, the individual staff, and the administrative personnel needed for the program. 8:10 A.M.; conference hours, MW 9:10 A.M.

- 272 *The Teacher and School Supervision* (3) Fox
Nature, organization, human relationships, and techniques. 10:20 to 11:20 A.M.; conference hours, T 9:10 A.M. and Th 2:00 P.M.

- 279 *Adult Education* (3) Radner
Current concepts and objectives, agencies involved, programs in all levels—elementary through community. TTh 6:40 to 9:20 P.M.; conference hours, 6:00 P.M.

- 285 *Extra-Classroom Activities* (3) Root
Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student councils, interscholastic contests; particular attention to sponsorship, participation, finance, and evaluation. MW 6:40 to 9:00 P.M.; conference hours, 6:00 P.M.
- 295 *Educational Research Methods and Procedures* (3) Fox
Required of all Master's candidates following Plan 2. 1:00 to 2:00 P.M.; conference hours, MW 2:10 P.M. and F 9:10 A.M.
- 297 *Reading in Education* The Staff
To assist those preparing for the comprehensive examination. No credit toward degree requirements. Tuition fee, \$15. 4:10 P.M.
- 299-300 *Thesis* (3-3) The Staff
Required of all Master of Arts candidates following Plan 1. Time to be arranged.

POST-SESSION

August 15 to September 2

- 122 *Society and the School* (3) Angel
For the general student as well as the prospective teacher. Organization and operation of schools; principles and functions. 10:00 to 12:00 A.M.; small group discussions, conferences, and field work in the afternoon.
- 207 *Curriculum Materials* (3) Bish
For experienced teachers. The study and comparison of courses of study, resource units, classroom teaching aids, and inexpensive materials; direct application to student's own situation. 9:00 to 11:00 A.M.; conference hour, 11:10 A.M.; small group discussions and field work in the afternoon.

ENGLISH*

ENGLISH COMPOSITION

- A *English Practice* (3) Moore and Staff
Instruction, drill, and exercises in grammar, vocabulary, spelling, and mechanics in general; instruction and exercises in composition and reading. This course is designed to prepare students for English 1. Section A: 11:10 A.M.; section B: 8:10 P.M.

* Before students are registered in English 1, they are tested in the minimum essentials of vocabulary, spelling, grammar, standard usage and writing skill. Those students who show marked superiority may, upon passing further tests, be exempted from one or both terms of the English Composition course; those who are inadequately prepared for English 1 will be assigned to English A.

All pre-Columbian College students (who are required to take one year of English composition and one year of literature in English, Classical Languages, French, German, or Spanish) will follow the sequence of English 1, both terms of one of the introductory literature courses, and English 4. English 2 is the second term of the six-hour composition course required of students not following the pre-Columbian College curricula.

English 1 is prerequisite to all other courses in English.

B *English for Foreign Students* (3)

Allee

A course in reading and writing designed to prepare the student for English 1. Special attention is given to spelling, syntax, grammar, idiom, and vocabulary. 6:10 P.M.

1 *English Composition** (3)

Moore and Staff

Review of grammar, exercises in composition, readings. Section A: 11:10 A.M.; section B: 8:10 P.M.

2 *English Composition** (3)

Moore and Staff

Exercises in composition, readings. The second term of the six-hour composition course required of all students not in the pre-Columbian College curricula. Section A: 10:10 A.M.; section B: 7:10 P.M.

4 *English Composition* (3)

Moore and Staff

A course in critical analysis and practice of expository and argumentative techniques and in research procedure. This is the second term of the six-hour composition course required of students in the pre-Columbian College curricula. Prerequisite: English 1 and both terms of an introductory literature course. Section A: 10:10 A.M.; section B: 7:10 P.M.

11 *The Writing of Reports* (3)

Turner

Theory and practice in the writing of technical reports. 6:10 P.M.

ENGLISH LITERATURE ‡

51 *Introduction to English Literature* (3)

Tupper

A historical survey. From beginnings to 1800. 7:10 P.M.

52 *Introduction to English Literature* (3)

Linton

A historical survey. Literature since 1800. 10:10 A.M.

91 *Introduction to European Literature* (3)

Shepard

Consideration of various types. 11:10 A.M.

136 *Shakespeare* (3)

Tupper

The tragedies. 11:10 A.M.

162 *Victorian Literature* (3)

Shepard

Poetry from 1830 to 1900. 10:10 A.M.

166 *The Twentieth Century* (3)

Linton

The novel and drama since 1900. 6:10 P.M.

244 *Studies in Eighteenth Century Drama* (3)

Stone

MTH 8:10 to 10:00 P.M.

* See footnote on page 42.

‡ All pre-Columbian College students (who are required to take one year of English composition and one term of literature in English, Classical Languages, French, German, or Spanish) will follow the sequence of English 1, both terms of one of the introductory literature courses, and English 4.

English 51-52, 71-72, 91-92, Classical Languages and Literatures 71-72, French 51-52, German 51-52, or Spanish 51-52 is prerequisite to all second group courses in English.

AMERICAN LITERATURE *

- 71 *Introduction to American Literature* (3) Bolwell
A historical survey. From beginnings to 1860. 6:10 P.M.
- 72 *Introduction to American Literature* (3) Coberly
A historical survey. Literature since 1860. 9:10 A.M.
- 176 *American Drama* (3) Bolwell
Historical and critical study of twentieth century plays. 7:10 P.M.

GEOGRAPHY

- 51 *Introduction to Geography* (3) Westermann
A study of place attributes and characteristics; patterns and associations of physical and cultural earth features. 8:10 A.M.
- 52 *World Regions* (3)
The analysis of world regional divisions; description and interpretation of physical-cultural complexes; evaluation of regional differences as they affect the distribution and activities of man. 6:10 P.M.
- 171 *Field Geography* (3) Quam and Staff
Field study methods, training in mapping and analysis techniques for both rural and urban areas. Prerequisite: Geography 51 and 52. Transportation fee: \$15. June 18 to August 2, 8:00 A.M. to 4:00 P.M.
- 185 *Africa* (3) Fischer
Regional survey. No prerequisite. MTWTh 5:55 to 7:00 P.M.

GERMAN

- †1-2 *First-year German* (3-3) Rogers, Leuner, and Staff
The essentials of German grammar; translation of early prose. Second half begins July 18. Section A, 6:10 to 11:00 A.M.; section B, 6:10 to 8:00 P.M.
- †3-4 *Second-year German* (3-3) Rogers, Leuner
Selections from modern German prose; review of grammar. Prerequisite: German 1-2 or two years of high school German. Second half begins July 18. 6:10 to 8:00 P.M.
- 49 *German Readings for Non-major Students* (3) Leuner
Designed primarily for graduate students preparing for reading examinations. Undergraduates admitted with the permission of the instructor. No academic credit for graduate students. July 18 to August 18, 6:10 to 8:00 P.M.

* See footnote (2) on page 43.

† A dagger preceding an odd-numbered course indicates that it is the first half of a full-year course, the second half of which must be completed before credit is allowed.

HISTORY*

- 39 *The Development of European Civilization to 1048* (3) Kayser
Primarily for freshmen. The political, social, economic, and cultural history of the Old World from ancient times through the Reformation period. 7:00 A.M.
- 40 *The Development of European Civilization since 1048* (3) Davis
Primarily for freshmen. The political, social, economic, and cultural history of the Old World from the Reformation period to the present. 6:15 P.M.
- 71 *The Development of the Civilization of the United States to 1805* (3) Haskett
Primarily for sophomores. The political, social, economic, and cultural history of the United States from the period of discovery through the Civil War. 10:10 A.M.
- 72 *The Development of the Civilization of the United States since 1805* (3) Haskett
Primarily for sophomores. The political, social, economic, and cultural history of the United States in their world setting from 1805 to the present. 7:10 P.M.
- 130 *Nationalism* (3) Kayser
The historical evolution of modern nationalism. 8:00 A.M.
- 149 *European Diplomatic History to 1871* (3) Davison
Background of the European state system and of the diplomatic practices and relations since the Congress of Vienna, with emphasis on the policies and actions of the great powers and their statesmen. 8:00 A.M.
- 150 *European Diplomatic History since 1871* (3) Davison
Background of the European state system and of the diplomatic practices and relations, with emphasis on the policies and actions of the great powers and their statesmen. 9:10 A.M.
- 166 *Mexico and the Caribbean since Independence* (3) Davis
A survey of the republics of Mexico, Central America, and the Caribbean Islands. 7:10 P.M.
- 172 *Social History of the United States* (3) Gray
Data: life, institutions, intellectual and artistic achievements of the United States from 1801 to the present time. 10:10 A.M.
- 173 *Representative Americans* (3) Gray
A biographical approach to national history. Some fifty significant and typical personalities in the development of the United States in government, business, science, religion, journalism, the arts, and social reform. 12:10 A.M.

*History 37-40 is a prerequisite to courses 101 through 104 and 105 through 106. History 71-72, 107, and 108 are prerequisites to 154.

- 181 *Diplomatic History of the United States to 1871* (3) Haskett
Tendencies toward isolation, expansion, and collectivism; disputes with foreign countries and their settlement; and the activities of the American secretaries of the state and diplomatic agents. 6:10 P.M.
- 199-200 *Proseminar: the Literature and Method of History* (3-3) The Staff
Limited to majors in History. Hours to be arranged.
- 299-300 *Thesis* (3-3) The Staff
Required of all candidates for the Master's degree specializing in history. Hour to be arranged.

LAW

FIRST SESSION

- 101 *Legal Method and Legal System* (4) Orentlicher
Introduction to study of substantive and procedural law dealing with basic concepts. Training in method and technique of case law, based upon modern records in state and federal cases, followed by practice in the use of law books and legal writing. Importance of language in law, legal reasoning, statutory interpretation, and use of precedents, under the doctrine of stare decisis, law of the case, and res judicata. Background development of Anglo-American legal system, organization of the judiciary and the bar, stressing enforcement of ethical standards. 5:50 to 7:40 P.M.
- 133 *Personal Property* (2) Mayo
Concepts of property and ownership, possession, finding, bailment, liens and pledges, acquisition of title by bona fide purchase, adverse possession, easements, expropriation, judgment, satisfaction of a judgment, and will. MW 11:10 A.M. to 1:30 P.M.; F 12:10 P.M.
- 138X *Real Property* (4) Benson
Historical background of the law of estates and conveyances; adverse possession; leasehold estates; reversionary estates, easements, profits, covenants, and equitable servitudes; natural rights. 5:50 to 7:40 P.M.
- 205 *Civil Procedure* (4) Burke, Boisvert
Function and composition of pleadings, including their relation to proof. Emphasis is upon reform, as exemplified by modern code provisions and the Federal Rules of Civil Procedure. Section A: 9:10 to 11:00 A.M.; section B: 5:50 to 7:40 P.M.
- 303 *Administrative Law* (4) Davison
The position of the administrative process in the separation of powers including the status of administrative personnel, administrative hearings, judicial scrutiny of administrative action, discretion, and rule making—particularly as relating to federal administrative agencies. 5:50 to 7:40 P.M.

317 *Creditors' Rights* (4)

Remedies of unsecured creditors; judgments, fraudulent conveyances, creditors' agreements, equity and statutory receiverships, and bankruptcy. The general approach is that of law administration. 5:50 to 7:40 P.M.

326x *Insurance* (2)

The insurance device in life, property, and other risks. TTh 11:10 A.M. to 1:00 P.M.; F 11:10 A.M. Mayo

381 *Trusts* (4)

Creation, elements, administration, enforcement, termination. Liability to and of third persons. Resulting and constructive trusts. 9:10 to 11:00 A.M.

SECOND SESSION

123x *Criminal Law and Procedure* (4)

Origin and purposes of criminal law; elements of criminal liability; mental disorders, solicitation, attempt, and conspiracy; crimes against the person, against property, and against health; statutory offenses; criminal procedure, with consideration of Federal Rules of Criminal Procedure. 5:50 to 7:40 P.M. Cooper

208 *Evidence* (4)

Functions of court and jury; witness, hearsay, opinion, and circumstantial evidence; proof of authenticity and content of writings. Section A: 9:10 to 11:00 A.M.; section B: 5:50 to 7:40 P.M. Fryer, Weston

209x *Conveyances and Wills* (4)

Land contracts, conveyances, mortgages, recording; formation and revocation of wills, testate and intestate succession. 5:50 to 7:40 P.M. Leslie

214 *Legal Accounting* (2)

A study of elementary accounting principles and techniques; application of accounting principles to legal problems. M 11:10 A.M. to 1:00 P.M. Fey

223x *Domestic Relations* (2)

Marriage, annulment, and divorce, rights of husband and wife, rights of parent and child, infants. M 12:10 A.M., WF 11:10 A.M. to 1:00 P.M. Mallison

270 *Corporations* (4)

Legal requirements as to contributions of capital, powers and rights of corporations, corporate officials, and shareholders. 9:10 to 11:00 A.M. Weaver

333x *Legislation* (2)

The legislative process, with particular emphasis on its operation in the federal and state governments; legislative organization and procedure; kinds of statutes; statutory interpretation. MTh 5:50 to 7:40 P.M. Mallison

375X *Taxation—Federal Income* (4)

A study of the federal income tax, including construction of statutes, practice and procedure, and legislative policy in the development of the income tax structure. 5:50 to 7:40 P.M.

MATHEMATICS

3 *College Algebra* (3) The Staff

Prerequisite: one year each of high school algebra and high school geometry. Section A: 9:10 A.M.; section B: 7:10 P.M.

6 *Plane Trigonometry* (3) The Staff

Prerequisite: two years of high school algebra and one year of high school geometry, or Mathematics 3. Section A: 10:10 A.M.; section B: 6:10 P.M.

12 *Analytic Geometry* (3) The Staff

Prerequisite: Mathematics 6, or two years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry. Section A: 11:10 A.M.; section B: 7:10 P.M.

19 *Differential Calculus* (3) The Staff

Prerequisite: Mathematics 12. Section A: 12:10 A.M.; section B: 6:10 P.M.

20 *Integral Calculus* (3) The Staff

Prerequisite: Mathematics 19. Section A: 11:10 A.M.; section B: 7:10 P.M.

134 *Introduction to Boundary Value Problems* (3) Taylor

Prerequisite: Mathematics 123 or 132. 6:10 P.M.

270 *Tensor Analysis* (3) Taylor

7:10 P.M.

PHARMACY

192 *Hospital Pharmacy: Prescription Practice* (1) Cooper

Prescription practice in the University Hospital Pharmacy. Prerequisite: Pharmacy 102. Laboratory—time to be arranged.

194 *Manufacturing Pharmacy* (3) Cooper

The manufacture of bulk pharmaceuticals in the University Hospital pharmacy. Elective for seniors. Lecture and laboratory—time to be arranged.

PHILOSOPHY

51 *Introduction to Philosophy* (3) Weimer

A critical introduction to the problems of modern philosophy in relation to scientific and social developments since the Renaissance. TWTh 7:10 to 8:35 P.M.

- 111 *History of Philosophy* (3) Womack
A history of philosophical ideas in the western world from 600 B.C. to the Middle Ages. TWTh 5:35 to 7:00 P.M.

- 171 *American Philosophy* (3) Womack
A history of philosophical ideas in America from the 17th century until the era following the Civil War. Emphasis on foreign influences and the effect of philosophical thought on social and political developments. TWTh 11:10 A.M. to 12:35 P.M.

PHYSICS

- 5 *General Physics* (3) Koehl
An introduction to the phenomena of light, heat, force, energy, and the properties of matter. This course may be taken as a terminal course by non-science students who wish an introduction to the physical sciences. Prerequisite: High school algebra and plane geometry. Material fee, \$9. Lecture—MW 11:10 A.M.; recitation, TTh 11:10 A.M.; laboratory—TTh 1:10 to 3:40 P.M.

- 7 *General Physics* (3) Turner, Hobbs
Elementary electricity and magnetism. Prerequisite: Physics 5*; high school algebra and plane geometry. Material fee, \$9.

Section	Lecture	Recitation	Laboratory
A.....	TTh 1:10 P.M.	MW 1:10 P.M.	MW 3:10-4:30 P.M.
B.....	TTh 6:10 P.M.	MW 6:10 P.M.	TTh 8:10-1:30 P.M.
C.....	TTh 6:10 P.M.	MW 7:10 P.M.	MW 8:10-1:30 P.M.

- 8 *General Physics* (3) Koehl, Hobbs
Foundation of modern physics—the experimental evidence concerning light waves and quanta, X-rays and radio waves, electrons, protons, and other elementary particles; atomic and molecular structure; and nuclear physics. Prerequisite: Physics 6 and 7. Lecture—MW 5:45 to 7:00 P.M.; recitation TTh 6:10 P.M.

POLITICAL SCIENCE ‡

- 9 *Government of the United States* ‡ (3) Brewer, West
Fundamental principles of political science. The structure, powers, and operation of the Federal Government, Congress, the President, and the Supreme Court. Section A: 11:10 A.M.; section B: MTWTh 7:10 to 8:15 P.M.

- 10 *Government of the United States* ‡ (3) Ludden
Analysis of the structure, powers, and operation of state and local government; political parties, pressure groups, and civil rights. Major functions of governments at federal, state, and local levels. MTWTh 5:55 to 7:00 P.M.

* This prerequisite may be waived for students who have credit for a high school physics course which included individual laboratory work, provided they pass the qualifying examination given at the dates specified in the University calendar.

‡ Political Science 9-10 is prerequisite to all other courses in Political Science.

- 107 *Problems of Modern Political Thought* (3) Kraus
Development of democratic political institutions and analysis of the main challenges to constitutional democracy in the 19th and 20th centuries. MTWTh 5:55 to 7:00 P.M.
- 113 *Political Problems of the British Commonwealth of Nations* (3) Kraus
A discussion of the transformation of the Colonial Empire into the modern Commonwealth, questions of equal partnership, and governments and politics in the principal dominions. 9:10 A.M.
- 121 *The Constitution of the United States* (3) West
The judicial power of the federal courts in constitutional interpretation. Special attention to state and federal relationships, taxation, and legislative-executive-judicial relationships. 10:10 A.M.
- 145 *Political Parties and Politics* (3) Ludden
Survey and analysis of organization and operation of political parties in the United States; major and minor parties, bosses and corruption, nominations and elections, influence on President and Congress. 11:10 A.M.
- 171 *International Politics* (3) Ludden
Basic forces underlying the conduct of international relations and the formation of foreign policy: power politics, imperialism, collective security, and international cooperation. MTWTh 7:15 to 8:15 P.M.
- 181 *International Law* (3) Brewer
General survey of the public law of nations with particular emphasis on the law of peace. 10:10 A.M.
- 220 *Reading Course in Political Theory* (3) Kraus
Readings and group discussions, principally in the field of modern political and constitutional theory since the 17th century. TTh 8:10 to 10:00 P.M.
- 226 *Problems of Governmental Reorganization* (3) Torpey
Intensive consideration of the Hoover Commission reports and related documents, and their implications, obstacles, and aids to reorganization movements. MW 8:10 to 10:00 P.M.
- 277 *Seminar: Latin American Government* (3) Davis
Investigation and analysis of the political structures of selected Latin American regimes. Two comparable governments will be studied each year. TTh 8:10 to 10:00 P.M.
- 281 *Seminar: International Law and Relations* (3) Brewer
Research topics in the public law of nations, with special attention to problems of peace settlements, sanctions, war reparations, and the jurisdiction, and to their political implications. MW 8:10 to 10:00 P.M.
- 299-300 *Thesis* (3-3) The Student
Time to be arranged

PSYCHOLOGY

- 1 *General Psychology** (3) Hunt, Fox
The fundamental principles underlying human behavior. Section A: 9:15 A.M.; section B: MWF 7:10 to 8:35 P.M.
- 2 *Applied Psychology* (3) Fox
The application of psychology in business, industry, medicine, law, guidance, education, and social problems. MWF 5:35 to 7:00 P.M.
- 29 *Child Psychology* (3) Johnson
A genetic approach to the study of the child. 12:15 A.M.
- 98 *Abnormal Psychology* (3) Hunt
The causes, diagnosis, treatment, and prevention of the various types of maladjustments and mental disorders. MWF 11:15 A.M. to 12:35 P.M.
- 131 *Psychological Tests* (3) Johnson
A survey of psychological tests and their more common uses in business, industry, assessment, law, medicine, and education. Material fee, \$5. MW 7:15 to 9:25 P.M.
- 144 *Personnel Psychology* (3) Mosel
The applications of psychology to personnel work in education, business, industry, and government. TTh 5:45 to 8:00 P.M.
- 151 *Social Psychology* (3) Tuthill
The social foundations of attitudes and behavior. Individual adjustment to group situations, such as the family, school, fraternity, and occupation. The psychological basis of race prejudice, nationalism, and war. MWF 5:45 to 7:00 P.M.
- 156 *Psychology of Propaganda and Public Opinion* (3) Tuthill
The psychology of opinion formation, the measurement of opinion, the social determinants of attitudes, the psychological processes in persuasion, the bases of receptivity to propaganda, psychological warfare. MW 7:15 to 9:25 P.M.
- 171 *Psychology of Personality* (3) Caldwell
Contemporary approaches to the study of personality. TTh 7:15 to 9:25 P.M.
- 193 *Readings in Psychology* (3) The Staff
Supervised readings on specific topics in psychology, with instructions for independent making. Open only to students with previous or more credits in psychology with a prerequisite score of 3.0 or higher. Admission by permission of the instructor. Hours to be arranged.
- 205 *Field Work in Psychology* (3) The Staff
Supervised field work in various psychology psychological services. Admission by permission of the Director of the Department. Hours to be arranged.

* Psychology 1 is prerequisite to all other courses in Psychology.

- 207 *Readings in Psychology for Graduate Students* (3) The Staff
Supervised readings with conferences on specified topics in psychology. Admission by permission of the instructor. Hours to be arranged.
- 225 *Seminar: Mental Hygiene* (3) Caldwell
A study of mental health problems with special attention to problems of prevention. MW 7:15 to 9:00 P.M.
- 244 *Seminar: Job Analysis and Evaluation* (3) Mose
TH 8:15 to 10:00 P.M.
- 295 *Research in Psychology* (arr.) The Staff
Hours and credits to be arranged.
- 299-300 *Thesis* (3-3) The Staff

RELIGION

- 9 *The Old Testament* (3) Olmstead
A historical and literary approach to the study of the books of the Old Testament, with special consideration given to the development of religious ideas, institutions, and outstanding personalities. TW 6:15 to 7:35 P.M.
- 121 *Problems of Western Religious Thought* (3) Olmstead
The nature of religious truth and experience, the existence, character, and activity of God, the problems of modern man, the problems of evil and suffering, eternal life, science and religion, the meaning of worship, religious views of history. 11:15 A.M.

ROMANCE LANGUAGES AND LITERATURES

FRENCH

- †1-2 *First-year French* (3-3) The Staff
For beginners. Grammar, composition, drill in pronunciation, translation of modern French prose. Second half begins July 18. Section A: 8:15 to 10:00 A.M.; section B: 6:15 to 8:00 P.M.
- †3-4 *Second-Year French* (3-3) The Staff
Advanced grammar and composition, reading in modern French prose, oral practice, introduction to French civilization. Prerequisite: French 1-2 or two years of high school French. Second half begins July 18. Section A: 8:15 to 10:00 A.M.; section B: 6:15 to 8:00 P.M.

SPANISH

- †1-2 *First-year Spanish* (3-3) The Staff
For beginners. Grammar, composition, drill in pronunciation, reading of modern Spanish prose. Second half begins July 18. Section A: 8:15 to 10:00 A.M.; section B: 6:15 to 8:00 P.M.

†A dagger preceding an entry indicates course indicates that it is the first half of a first course, the second half of which must be completed before credit is allowed.

43-4 *Second-year Spanish (3-3)*

The Staff

Advanced grammar and composition, reading of modern Spanish prose, oral practice, introduction to Hispanic civilization. Prerequisite: Spanish 1-2 or two years of high school Spanish. Second half begins July 18. Section A: 8:10 to 10:00 A.M., section B: 8:10 to 8:40 P.M.

SLAVIC LANGUAGES AND LITERATURES

1-2 *First-year Russian (3-3)*

Yakobson

Beginner's course in fundamentals of grammar and pronunciation, with graded reading, oral drill, and written practice. Second half begins July 18. 8:10 to 8:40 P.M.

SOCIOLOGY*

1 *Introductory Sociology (3)*

Lavell, Willner

The origin and development of culture, man's social nature, types of groups and social interactions, social problems, social change and social control. Section A: 9:10 A.M., section B: MWF 5:35 to 7:00 P.M.

133 *The Family (3)*

Willner

A study of the primitive and modern family, changing functions and roles of the family and its members, factors promoting disorganization, family crises, family reorganization. MWF 7:10 to 8:40 P.M.

162 *Social Movements (3)*

Lavell

Main contemporary social movements examined as aspects of social change and adaptive behavior. Designed to discuss contemporary theories and show the way in which social movements develop. 12:10 A.M.

295-96 *Research (art.)*

The Staff

Time and credits to be arranged

299-300 *Thesis (3-3)*

The Staff

SPEECH

A *Speech Clinic*

Pettit and Staff

Individual or group lessons, without academic credit, for such speech difficulties as stuttering, voice problems, articulation problems, and diction. Fee for individual lessons, \$6; for group lessons, \$4. Time to be arranged.

B *American Speech for Foreign Students*

Pettit and Staff

Individual or group instruction without academic credit in the formation of the sounds of spoken English, with emphasis on rhythm and intonation. The International Phonetic Alphabet is used. Fee for individual lessons, \$6; for group lessons, \$4. Time to be arranged.

* See also 1-4 for entrance to all other classes in Sociology.

† A three-semester or six-semester course in Sociology 124 or 125 in the first half of a full-year course, the second half of which must be completed before credit is allowed.

- 1 *Effective Speaking* (3) Leggett and Staff
Preparation and delivery of extemporaneous speeches; developing confidence and poise, body and voice control; selecting and organizing material. Recording fee, \$3. Section A: 8-10 A.M.; section B: MTWTh 7-10 to 8-15 P.M.
- 11 *Training the Speaking Voice* (3) Pettit and Staff
Developing ease, naturalness, and clarity in the speaking voice. Analysis of individual voices through recordings. Phonetic approach to the study of the sounds of English and the standards of speech. Recording fee, \$3. Section A: 12-1 P.M.; section B: MTWTh 5-5:30 to 7 P.M.
- 32 *Oral Reading* (3) Henig
Reading to others; theory and practice of interpreting the printed page. Prerequisite: Speech 11. Recording fee, \$3. 9-10 A.M.
- 131 *Group Discussion and Conference Leadership* (3) Henig
The process of thinking and problem solving in committees and small groups, and the methods of leading conferences and discussions. 11-10 A.M.
- 177-78 *Clinical Practice in Speech Therapy* (1-1) Pett
Case work in remedial speech. This course may be repeated for a total of three credit hours. Prerequisite: Speech 175. Time to be arranged.
- 183-84 *Clinical Practice in Hearing Therapy* (1-1) Pett
Case work with persons handicapped with hearing losses. This course may be repeated for a total of three credit hours. Prerequisite: Speech 182. Time to be arranged.

STATISTICS

- 51 *Introduction to Business and Economic Statistics* (3) Johns
Survey of elementary principles and procedures for presenting, analyzing, and interpreting statistical data; consideration of characteristics, measures of variability, sampling procedure, index number, time series analysis, and simple correlation. Prerequisite: one college unit in algebra. Laboratory fee, \$5. Lecture—MTWTh 7-10 P.M.; Laboratory—Th 8-10 to 9-5 P.M.
- 52 *Mathematics of Finance* (3)
Interest and discount, Annuities, valuation of stocks and bonds, use of life insurance, valuation of depreciable assets, application of life and auto insurance. Prerequisite: one college unit in algebra. MTWTh 5-5:30 to 7 P.M.
- 111-12 *Business and Economic Statistics I and II* (3-3) We
Statistics 111: characteristic values, measures of variability, sampling processes, sampling distributions, and simple correlation. Stat-

112 multiple and partial correlation, time series analysis, index numbers, business cycles, demand functions, and depreciation schedules. Admission by permission of the instructor. Statistics 111 or the equivalent is prerequisite to Statistics 112. Second half begins July 18. MTWTh morning hours to be arranged.

117 *Analysis of Variance* (3)

McCall

The analysis of variance and covariance to segregate factors producing important variation; a method to estimate experimental error; multiple comparison with unequal class frequencies. Prerequisite: Statistics 91-92 or the equivalent. MTWTh 5:35 to 7:00 P.M.

118 *Correlation and the Chi Square Test* (3)

McCall

Advanced study of simple, partial, and multiple correlation. Rank correlation, the method of contingency, and the problem of normal and non-normal populations. Tests of independence, fitness, and goodness of fit. Prerequisite: Statistics 91-92 or the equivalent. MTWTh 7:10 to 8:15 P.M.

207 *Operational Analysis** (3)

Johnson

Admission by permission of the instructor. Hours to be arranged.

ZOOLOGY

1-2 *Introduction to Zoology* (4-4)

Mortensen, Desmond

An introduction to the study of the structure, functions, and relation of animals, and of the fundamental biological principles involved. Material fee, \$9 for each half. Nine-week term. Lecture 2 begins Jan. 24 and ends August 22. Lecture—6:10 P.M.; laboratory—7:10 to 10:00 P.M.

145 *Introduction to Vertebrate Embryology* (3)

Hansen

The origin and early development of the individual and the formation of organ systems. Emphasis is placed on the time clock and its relation to the basic embryo. Material fee, \$9. Eight-week term. Lecture—MW 7:10 P.M.; laboratory—MW 8:10 to 10:00 P.M.; TTh 7:10 to 9:00 P.M.

295 *Research* (3)

The Staff

Investigation of special problems. Hours to be arranged.

299-300 *Thesis* (3-3)

The Staff

* Primarily for students of the Military Leadership and Public Program.

HOURLY SCHEDULE OF CLASSES •

MORNING CLASSES

7:10	8:10	9:10	10:10	11:10
Acct 111 (MTWTh 7-8:55) Econ 1A1 MTWTh 7:55-9: Econ 101A MTWTh 7:55-9: Hist. 36 (at 7)	Acct 1 Bus Adm 138 Chem 11-127 (S 13-1 20) Chem 151-527 (S 13-1 20) Fr 1-2AS (to 10) Fr 3-4AS (to 10) Geog 51 Geog 1715 (S 8-4) Hist 122 (at 8) Hist 149 (at 8) Speech 1-2AS (to 10) Speech 3-4AS (to 10) Speech 1A	Acct 104 Bus Adm 107 Econ 121 Eng 72 Geog 1-2AS (to 11) Hist 150 Hist 173 Math 3A Phil 88 113 Psych 1A Sec 1A Speech 32	Bat 1 lect (TThF) Bat 1 lab (MW to 12) Econ 2A Eng 181 Eng 272 (TTh to 12) Eng 3A Eng 4A Eng 52 Eng 162 Eng 71 Hist 172 Math 6A Math 19A Phil 88 121 Phil 88 181 Psych 29 Sec 162 Speech 11A	Bat 2 lect (F) Bat 2 lab (TTh to 1) Econ A—Sect A Eng 1A Eng 91 Eng 196 Math 12A Math 2A Phil 171 (TWTTh to 12:35) Physics 5 lect (MW) Physics 5 rec (TTh) Phil 88 6A Phil 88 145 Phil 88 (MWF to 12:35) Relig 121 Speech 131

• Classes meet Monday through Friday unless otherwise indicated. Seminars and research courses for which hours are to be arranged, courses in the Law School, and the School of Education will be listed under the departmental announcements.

† New-work term: Second half—July 21 to August 22.

• Second half begins July 18.

† June 18 to August 22.

• July 18 to August 15.

AFTERNOON CLASSES

12:10	1:10	2:10
Bot 2 lect (MW)	Biol 1-24 (to 5) Chem 21 (TWThF to 5) Physics 5 lab (Th to 3:50) Physics 7A acct (TTh) Physics 7A rec (MW)	Physics 7A lab (MW to 4:30)

EVENING CLASSES

MTWTh 5:55-7	6:10	7:10	8:10
Acct 155 Art 71 (at 5:10) Bus Adm 149 Econ 11B Econ 140B Econ 182 Geog 185 Phy 111 (TWTh 5:35-7) Physics 8 lect (MW 5:45-7) Pol Sc 12 Pol Sc 127 Psych 2 (MW 5:35-7) Psych 144 (TTh 5:45-8) Psych 151 (MW 5:35-7) Soc 1B (MW 5:35-7)	Art 72 Bus Adm 102 Econ B Eng 11 Eng 71 Eng 166 Fr 1-2B8 (to 8) Fr 3-4B8 (to 8) Geog 52 Ger 1-2B8 (to 8) Ger 3-48 (to 8) Ger 421 (to 8) Hist 42 Hist 181 Math 6B	Acct 1-28 (to 6) Acct 132 (TTh to 9:25) Acct 275 (MW to 9:25) Bus Adm 106 Bus Adm 131 Econ 2B Econ 102 Econ 251 (TTh to 9) Econ 284 (MW to 9) Eng 2B Eng 4B Eng 51 Eng 176 Hist 72 Hist 106	Bus Adm 201 (TTh to 10) Eng A—Sect B Eng 1B Eng 244 (MTTh to 10) Physics 7B lab (TTh to 12:30) Physics 7C lab (MW to 12:30) Pol Sc 220 (TTh to 10) Pol Sc 226 (MW to 10) Pol Sc 277 (TTh to 10) Pol Sc 281 (MW to 11) Psych 244 (TTh to 10) Stat 51 lab (TTh to 9:50) Zoo 145 lab (MW to 10)

EVENING CLASSES (Continued)

MTWTh 5:55-7	6:10	7:10	8:10
Speech 11B Stat 52 Stat 117	Math 10B Math 11A Physics 7B lect (TTh) Physics 7B rec (MW) Physics 7C lect (TTh) Physics 8 rec (TTh) Refr 9 (TWTh to 7:35) Russian 1-28 (to 8) Span 1-28 (to 8) Span 3-48 (to 8) Zoo 1-24 lect	Math 11B Math 12B Math 22B Math 270 Phil 51 (TWTh to 8:35) Phys 7C rec (MW) Pol Sc 9B (MTWTh to 8:15) Pol Sc 171 (MTWTh to 8:15) Psych 1B (MW to 8:35) Psych 131 (MW to 9:25) Psych 156 (MW to 9:25) Psych 171 (TTh to 9:25) Psych 225 (MW to 9) Soc 133 (MWF to 8:35) Speech 1B (MTWTh to 8:15) Stat 51 lect (MTWTh to 8:15) Stat 118 (MTWTh to 8:15) Zoo 1-24 lab (to 10) Zoo 145 lect (MW) Zoo 145 lab (TTh to 9)	

THE CATALOGUE ISSUE

1955-56

THE
GEORGE
WASHINGTON
UNIVERSITY
BULLETIN

VOL. LIV

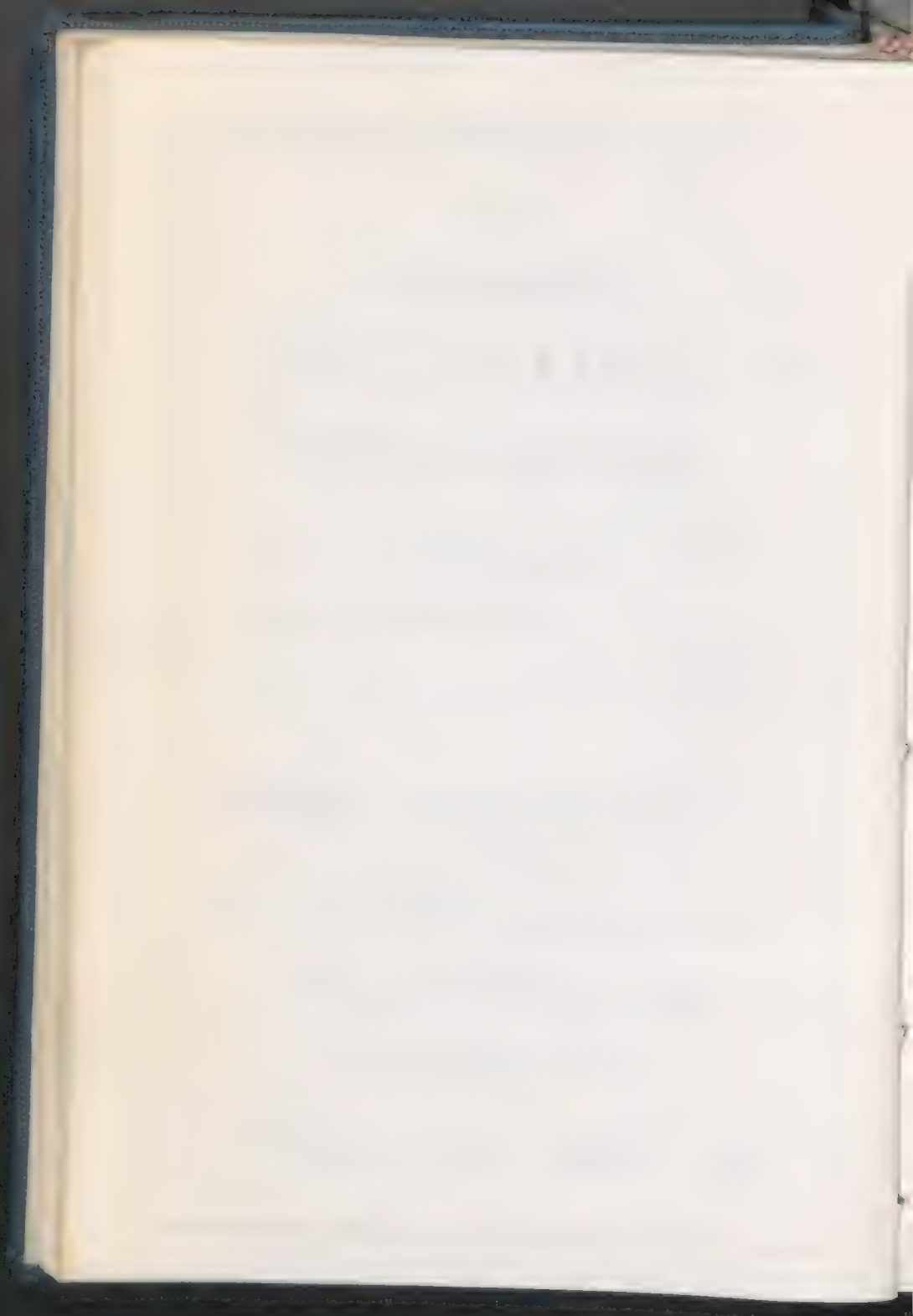
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THE CATALOGUE ISSUE

WASHINGTON, D. C.

PUBLISHED IN APRIL
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BY THE UNIVERSITY



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THE UNIVERSITY CALENDAR

1955

1956

July

S	M	T	W	T	F	S
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

August

7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
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September

4	5	6	7	8	9	10
11	12	13	14	15	16	17
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October

2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
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30	31					

November

6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December

4	5	6	7	8	9	10
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18	19	20	21	22	23	24
25	26	27	28	29	30	31

January

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29	30	31				

February

5	6	7	8	9	10	11
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26	27	28	29			

March

4	5	6	7	8	9	10
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18	19	20	21	22	23	24
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April

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29	30					

May

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27	28	29	30	31		

June

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24	25	26	27	28	29	30

July

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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

August

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12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September

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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

October

7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

November

4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

December

2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

THE UNIVERSITY CALENDAR

1955-56

Date	Day	Occasion
1955 FALL TERM: Sept. 6-16	Tuesday through Friday	Preadvising for all entering Junior College and School of Engi- neering Students
Sept. 19	Monday	Orientation Assembly for all new students
Sept. 20	Tuesday	Freshman tests Examinations for students who wish to qualify for advanced courses or waive curriculum re- quirements
Sept. 21	Wednesday	Curriculum Assembly for all new students
Sept. 22 and 23	Thursday and Friday	Meeting of the University Faculty Registration*
Sept. 26	Monday	Academic year begins*
Oct. 7	Friday	Last day on which candidates may file thesis subjects for the Master's degrees to be conferred in February
Oct. 13	Thursday	Stated meeting of the Board of Trustees
Oct. 14	Friday	Last day on which candidates may file dissertation subjects for the degrees of Doctor of Philosophy, Doctor of Educa- tion, and Doctor of Business Administration to be conferred the following June
Nov. 11	Friday	Fall Convocation. Holiday
Nov. 24-26	Thursday through Saturday	Thanksgiving recess
Nov. 29	Tuesday	Meeting of the Academic Council
Dec. 8	Thursday	Stated meeting of the Board of Trustees
Dec. 19-31	Monday through Saturday	Christmas recess
1956 Jan. 2	Monday	Classes resume Last day for receiving theses of candidates for the Master's de- grees and for the professional degrees in Engineering to be conferred in February

*In the School of Medicine, registration is conducted September 15 and 16, classes begin September 19.

THE UNIVERSITY CALENDAR—Continued

Date	Day	Occasion
Jan. 3	Tuesday	Last day for receiving dissertations of candidates for the degrees of Doctor of Philosophy, Doctor of Juridical Science, Doctor of Education, and Doctor of Business Administration to be conferred in February
Jan. 18	Wednesday	Last day of classes for the fall term
Jan. 23-31	Monday through Tuesday	Examination period
SPRING TERM: Feb. 1	Wednesday	Examinations for students who wish to qualify for advanced courses or waive curriculum requirements
Feb. 2 and 3	Thursday and Friday	Registration
Feb. 6	Monday	Classes resume for the spring term
Feb. 9	Thursday	Stated meeting of the Board of Trustees
Feb. 17	Friday	Last day on which candidates may file thesis subjects for the Master's degrees to be conferred in June
Feb. 22	Wednesday	Winter Convocation. Holiday
March 1	Thursday	Applications for fellowships for 1956-57 should be filed
March 8	Thursday	Stated meeting of the Board of Trustees
March 27	Tuesday	Meeting of the University Faculty
March 30- April 4	Friday through Wednesday	Easter recess
April 2	Monday	Applications for scholarships for 1956-57 should be filed
April 13	Friday	Last day for receiving dissertations of candidates for the degrees of Doctor of Philosophy, Doctor of Education, and Doctor of Business Administration to be conferred in June
May 1	Tuesday	Meeting of the Academic Council
May 4	Friday	Last day for receiving theses of candidates for the Master's degrees and for the professional degrees in Engineering to be conferred in June

THE UNIVERSITY CALENDAR—Continued

Date	Day	Occasion
May 10	Thursday	Annual meeting of the Board of Trustees
May 16	Wednesday	Last day of classes for the spring term
May 21-29	Monday through Tuesday	Spring term examination period
June 3	Sunday	Baccalaureate Sermon
June 6	Wednesday	Commencement
SUMMER TERM:*		
June 18	Monday	Registration for the eight-week term
June 19	Tuesday	Classes begin
July 4	Wednesday	Independence Day. Holiday
Aug. 11	Saturday	Foreign-language examinations for candidates for the Master's degrees
Aug. 13	Monday	Eight-week term ends Last day for receiving theses for the Master's degrees and for the professional degrees in Engineering to be conferred in November
Sept. 7	Friday	Last day for receiving dissertations of candidates for the degrees of Doctor of Philosophy and Doctor of Education to be conferred in November
Sept. 20 and 21	Thursday and Friday..	Registration for the fall term of the academic year 1956-57

* For all schools and colleges offering courses in the Summer Term except the Law School and the School of Education.

The dates of the calendar for the law School will be announced.

The calendar for the special sessions of the School of Education is as follows: Pre-session, June 11-20; Six-Week Session, July 2-August 10; Post-session, August 13-31. Registration for each of these sessions is on the first day of classes.

OFFICERS AND COMMITTEES
OF THE UNIVERSITY

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1956

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Eugene Cassin Carusi, A.M., J.D.; 1025 Connecticut Avenue
Mrs. Joshua Evans, Jr., A.B., Ed.D.; 3405 Lowell Street
*Robert Elliott Freer, A.B., LL.M.; 1025 Connecticut Avenue
Ulysses S. Grant, 3d, B.S., Graduate United States Engineers School;
1135 Twenty-first Street
John Edgar Hoover, LL.M., LL.D.; United States Department of
Justice
Frank Atherton Howard, B.S. in M.E., LL.B.; 30 Rockefeller Plaza,
New York City
Evan Howell, B.S., LL.B.; 1625 K Street
*Miss Helen Newman, LL.M.; Library, United States Supreme Court
Walter Rupert Tuckerman, A.B., LL.B., LL.D.; 5215 Edgemoor Lane,
Bethesda, Maryland

1957

- Walter Maximillian Bastian, LL.B.; United States Court of Appeals
Mrs. Wilbur John Carr; 2300 Wyoming Avenue
Newell Windom Ellison, A.B., LL.B.; 701 Union Trust Building
Gilbert Grosvenor, A.M., LL.D., Litt.D., Sc.D.; National Geographic
Society
*Brooks Hays, A.B., LL.B., LL.D.; The House Office Building
Alfred Henry Lawson, LL.B.; Riggs National Bank
John Keown McKee; 3010 Forty-fifth Street
Benjamin Mosby McKelway; The Evening Star Building
*James Matlack Mitchell, A.M.; National Science Foundation
Donald D'Arcy Shepard, LL.B.; 1701 K Street
Lloyd Bennett Wilson; Willow Spring, Bluemont, Virginia

* Nominated by the alumni

1958

John St. Clair Brookes, Jr., A.M., LL.B.; Colorado Building
Homer Cummings, Ph.B., LL.B., LL.D., L.H.D.; 1625 K Street
*Watson Davis, B.S. in C.E., C.E.; 1719 N Street
Robert Vedder Fleming, LL.D.; Riggs National Bank
Charles Carroll Glover, Jr., A.M., LL.B., LL.D.; Riggs National Bank
Godfrey Leon Munter, A.B., LL.B., LL.D.; Shoreham Building
Charles Hook Tompkins, D.Eng.; 907 Sixteenth Street
James Edwin Webb, A.B.; 218 N. Robinson Street, Oklahoma City,
Oklahoma
Alexander Wetmore, Ph.D., Sc.D.; Smithsonian Institution
*Charles Stanley White, M.D., Sc.D.; 1801 I Street

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Robert Vedder Fleming

Secretary of the Board of Trustees
Newell Windom Ellison

Assistant Secretary of the Board of Trustees
Clarence Aiken Aspinwall

* Nominated by the alumni.

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The Chairman of the Board of Trustees and the President of the University shall be members *ex officio* of each of the committees of the Board. The President of the University shall be Chairman of the Executive Committee.

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Mr. McKelway; Mr. Tuckerman

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Mr. Mitchell; Dr. White

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Mr. Tompkins; Mr. Webb; Dr. White; Mr. Wilson

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Mr. Webb; Mr. Wetmore; Dr. White

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Mr. McKee

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Mr. Wilson

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Don Carlos Faith, Ph.D., *Director of Activities for Men; Director of Veterans Education*
Alan Thomas Deibert, A.M., *Adviser to Students from Foreign Countries*
Burnice Herman Jarman, A.M., Ed.D., *Dean of the Summer Sessions*
Daniel LeRay Borden, A.M., M.D., *Director of Health Administration*
Ruth Harriet Atwell, A.M., *Director of Physical Education for Women*
Carl Swyter, B.S. in E.E., *Director of Air Science*
Benjamin Douglass Van Evera, Ph.D., Sc.D., *Coordinator of Scientific Activities*

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Henry Grattan Doyle, A.M., LL.D., Litt.D., *Dean of Columbian College*
Robert Whitney Bolwell, Ph.D., *Chairman of the Graduate Council*
Walter Andrew Bloedorn, A.M., M.D., Sc.D., *Dean of the School of Medicine; Medical Director of the University Hospital*
John Theodore Fey, LL.B., M.B.A., J.S.D., *Dean of the Law School*
Martin Alexander Mason, B.S. in Eng., Ing.-Dr., *Dean of the School of Engineering*
Charles Watson Bliven, M.S., *Dean of the School of Pharmacy*
James Harold Fox, A.M., Ed.D., *Dean of the School of Education*
Arthur Edward Burns, Ph.D., *Dean of the School of Government*
Elmer Louis Kayser, Ph.D., LL.D., *Dean of the Division of University Students*
Warren Reed West, Ph.D., *Dean of the Division of Special Students*
Mitchell Dreese, Ph.D., *Dean of the College of General Studies*
Victor Frederick Ludewig, A.B., B.S., *Administrator of the University Hospital*

- William Lewis Turner, Ph.D., *Assistant Dean of the Junior College*
Carr Bartleson Lavell, A.M., *Assistant Dean in the Junior College*
Calvin Darlington Linton, Ph.D., *Assistant Dean of Columbian College*
Angus MacIvor Griffin, Ph.D., *Assistant Dean of the School of Medicine*
Carville Dickinson Benson, A.B. LL.B., S.J.D., *Assistant Dean of the
Law School*
Louis Harkey Mayo, B.S., LL.B., *Assistant Dean of the Law School*
Ralph Windsor Ruffner, A.M., Ed.D., *Assistant Dean of the School of
Education*
Joe Lee Jessup, M.B.A., *Assistant Dean in the School of Government*
John Francis Latimer, Ph.D., *Assistant Dean of the College of General
Studies: University Marshal*
John Gage Allee, Jr., A.M., *Assistant Dean of the Division of Univer-
sity Students*

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The Dean of Faculties, *Vice Chairman*
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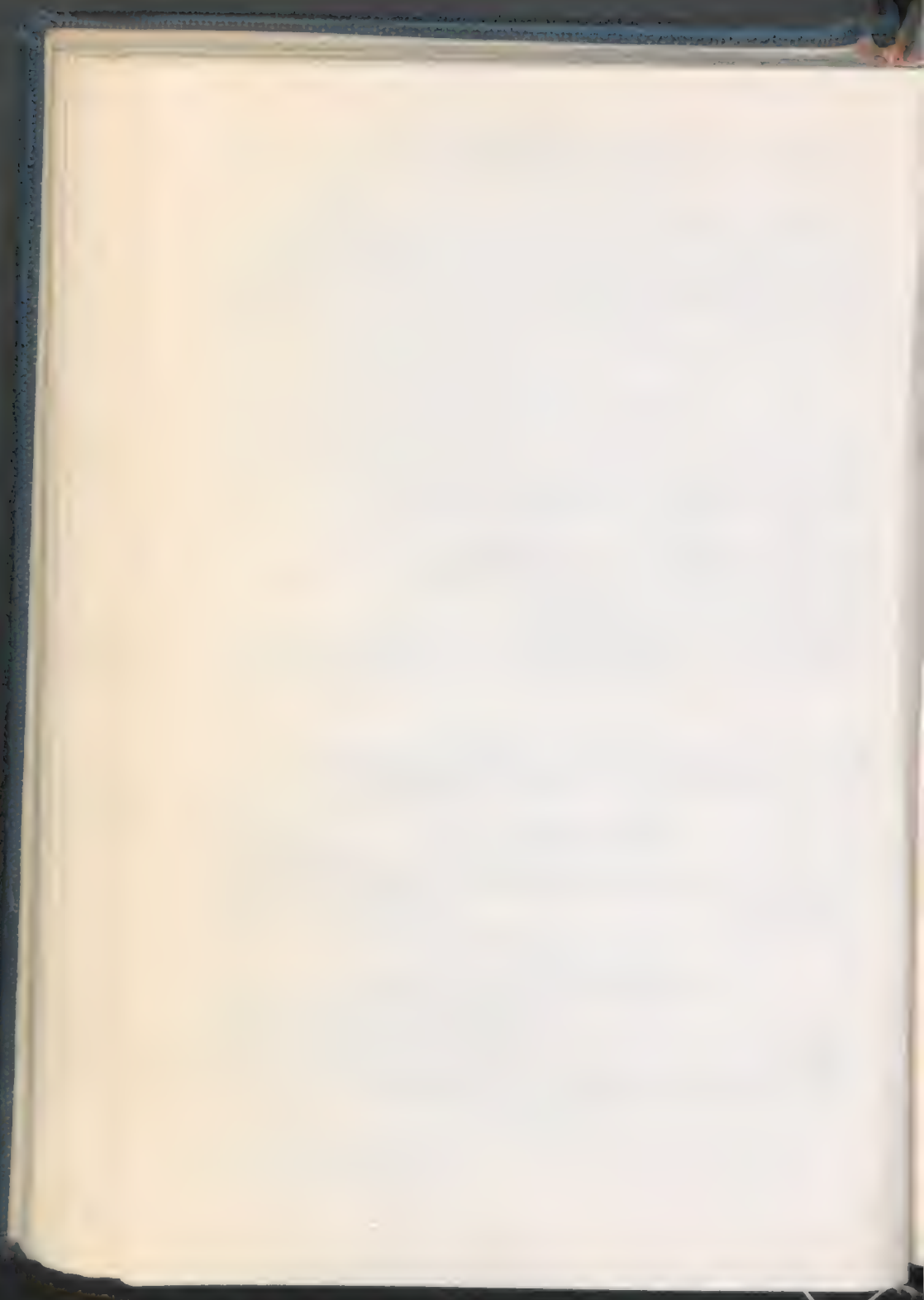
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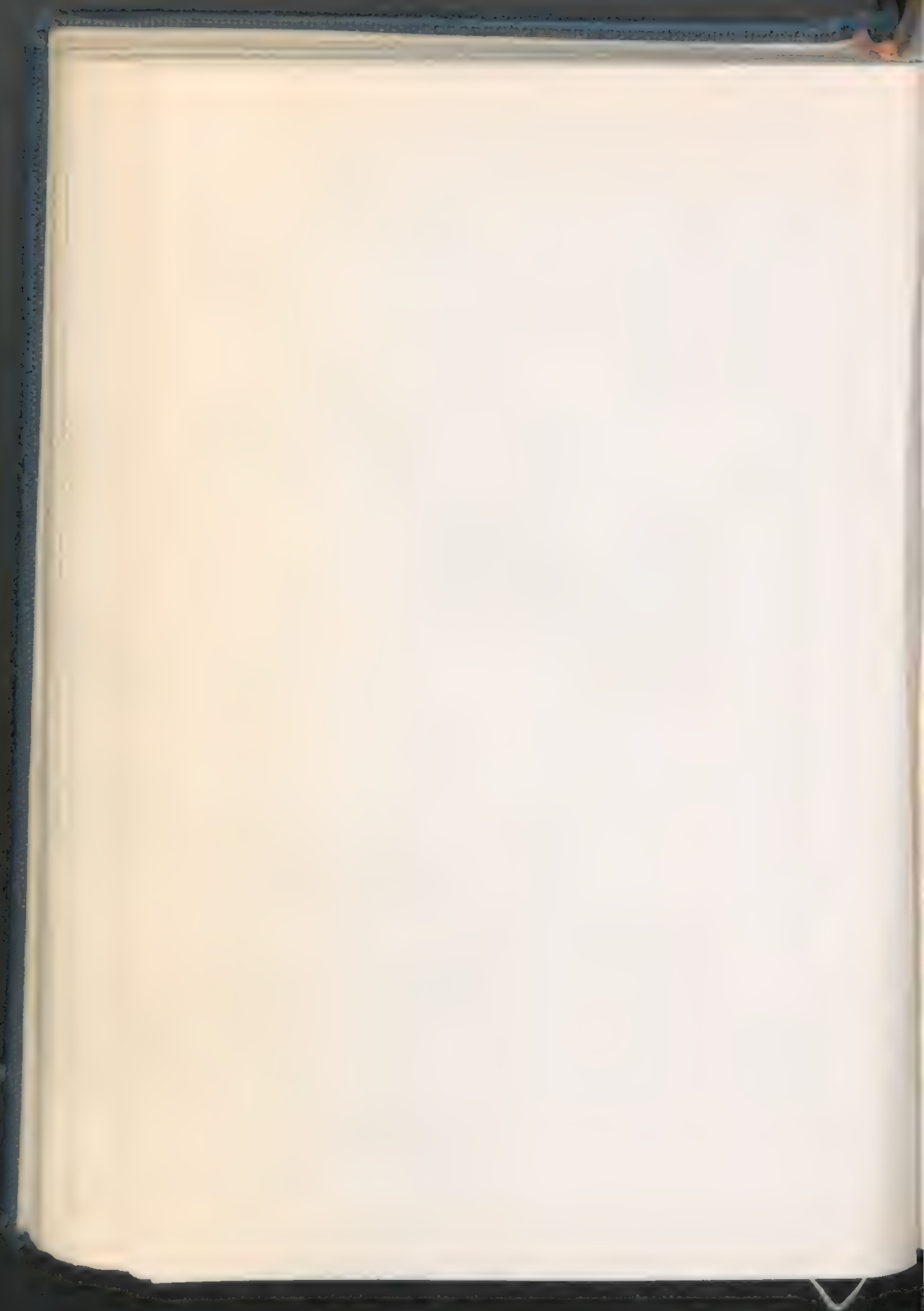
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HISTORY

The idea of a university located in the Capital of the Nation was sponsored by George Washington, who during his public life urged the establishment of such an institution and who in his will left fifty shares of stock in the Potomac (Canal) Company for the endowment of a university to be established in the District of Columbia "to which the youth of fortune and talents from all parts thereof might be sent for the completion of their Education in all branches of polite literature;—in arts and Sciences.—in acquiring knowledge in the principles of Politics & good Government".

It was George Washington's hope that the "General Government" would extend toward such an institution "a fostering hand". No steps were taken by Congress to carry out the provision of Washington's will, and the stock that he had bequeathed for the establishment of a university in the District of Columbia became valueless owing to the failure of the Potomac Canal properties.

Meanwhile, however, a movement was started by private persons under the leadership of Luther Rice to establish an institution of higher learning at the seat of the National Government for the education of the Baptist ministry and to afford general collegiate training. In 1819 an association was formed by Luther Rice, Obadiah B. Brown, Spencer H. Cone, and Enoch Reynolds for the purpose of raising funds to buy land for the use of the college.

A group of the Nation's leaders who were especially interested in Washington's idea became patrons of the college and contributed to funds raised for the purchase of land and erection of buildings. Among them were James Monroe, President of the United States; William H. Crawford, Secretary of the Treasury; John C. Calhoun, Secretary of War; William Wirt, Attorney General; Return J. Meigs, Postmaster General; and thirty-two members of Congress.

Legally to implement the college a petition was made to Congress for the incorporation of "the General Convention of the Baptist Denomination in the District of Columbia for evangelical and literary purposes". This petition was denied by Congress, on April 26, 1820, because of its sectarian character.

Failing to obtain a denominational charter, members of the association enlarged their objective to embrace national aims, and with the sponsorship of Government leaders there was presented in Congress a bill for the incorporation of "the Columbian Society for literary pur-

poses", it being proposed to realize in this way "the aspirations of Washington, Jefferson and Madison for the erection of a university at the seat of the federal government."

Acting upon this second petition, on February 9, 1821, Congress chartered Columbian College in the District of Columbia, inserting in the charter by special action the provision "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College or denied any of the privileges, immunities or advantages thereof, for or on account of his sentiments in matters of religion".

Thus Columbian College in the District of Columbia was chartered by Congress as one of the early nonsectarian institutions of higher learning in the United States, under the distinguished favor of President James Monroe and members of his Cabinet.

A tract of approximately forty seven acres, extending about one half mile northwest of Boundary Street (Florida Avenue) between Fourteenth and Fifteenth Streets, was purchased and by 1822 the main building was completed sufficiently to use.

Two years later, when the first Commencement was held on December 15, 1824, Congress and the Supreme Court adjourned their sessions to enable their members to attend the exercises. President Monroe, John Quincy Adams, John C. Calhoun, Henry Clay, and the Marquis de Lafayette headed the eminent company in attendance.

By an act of Congress of March 3, 1873, the name of the college was changed to "Columbian University", in recognition of the enlarged scope of the institution. In 1884 the University was moved from its first location on "College Hill", now Columbia Heights, to the new University Hall built for it at Fifteenth and H Streets. Near-by buildings accommodated the School of Medicine and somewhat later, the Law School.

For a period of six years, from 1868 to 1904, the University was placed under control of the Baptist Denomination. In 1904 an act restoring the original secular character of the University and authorizing change of name to The George Washington University was passed by Congress.

Subsequently all colleges, schools, and divisions of the University except the School of Medicine were brought together in the area bounded by Nineteenth, Twenty-third, and G Streets, and Pennsylvania Avenue NW. The School of Medicine is situated on H Street between Thirteenth and Fourteenth Streets NW.

The endowment of the University is \$4,000,000.

In 1970 a new plan of academic organization for the liberal arts work was effected in the establishment of the Junior College and the redefining of graduate work, as indicated below.

THE COLLEGES, SCHOOLS, AND DIVISIONS

The George Washington University includes fourteen colleges, schools, and divisions, as follows:

The Junior College offers the work of the first two years of the four-year college program in the liberal arts and sciences; two years of pre-professional work; and two-year terminal courses. Each of these curricula leads to the degree of Associate in Arts.

Columbian College offers the work of the junior and senior years of the four-year college program in the liberal arts and sciences leading to the degree of Bachelor of Arts and Bachelor of Science. It also offers the studies leading to the degrees of Master of Arts and Master of Science in the fields of liberal arts and sciences.

The Graduate Council offers a program of advanced study and research leading to the degree of Doctor of Philosophy.

The School of Medicine offers work leading to the degree of Doctor of Medicine.

The Law School offers professional and graduate courses leading to the degrees of Bachelor of Laws, Juris Doctor, Master of Laws, Master of Comparative Law, and Doctor of Juridical Science.

The School of Engineering offers courses leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering, Master of Science in Engineering, and Master of Engineering Administration. It also directs work leading to the professional degrees in the fields of civil, electrical, and mechanical engineering.

The School of Pharmacy offers courses leading to the degrees of Bachelor of Science in Pharmacy and Master of Science in Pharmacy.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education, Bachelor of Science in Home Economics, and Bachelor of Science in Physical Education, and graduate studies leading to the degrees of Master of Arts in Education and Doctor of Education.

The School of Government offers undergraduate programs of study in Foreign Affairs, Accounting, Business Administration, and Statistics, leading to the degree of Bachelor of Arts in Government. Graduate work is offered leading to the following degrees: Master of Arts in Government in the fields of Foreign Affairs, Economic Policy, Accounting, Business and Economic Statistics, and Counseling; Master of Arts in Public Administration in the fields of General Administration, and Governmental Fiscal Administration; Master of Arts in Personnel Administration; Master of Business Administration; and Doctor of Business Administration.

The College of General Studies supplements the adult education pro-

gram of the University through its Off-Campus Division, Campus Division, and Division of Community Services.

The Division of University Students makes available courses for mature students, not candidates for degrees in this University.

The Division of Special Students makes available courses for students in the process of qualifying for degree candidacy.

The Division of Air Science offers a program of Air Force ROTC training which is integrated with the curricula of the colleges and schools of the University and leads to appointment as a commissioned officer in the United States Air Force Reserve.

The Summer Sessions.

INSTRUCTIONAL DIVISIONS

The instructional divisions, established at The George Washington University in 1930, are organized on the basis of the relationship of course content, interrelation of methods and prerequisites, and similarity of background and viewpoint. Originally there were four divisions, Languages and Literatures, Mathematics and Physical Sciences, Natural Sciences, and Social Sciences. The plan is being restudied and a provisional alignment has been made which adds two new divisions, Applied Sciences and Medical Sciences.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. The School of Pharmacy is accredited by the American Council on Pharmaceutical Education as a class "A" school. It is a member of the American Association of Colleges of Pharmacy. The School of Engineering is on the accredited list of the Engineers' Council for Professional Development. The School of Education is a charter member of the American Association of Colleges for Teacher Education.

LOCATION

The George Washington University is in downtown Washington four blocks west of the White House and east of the Potomac River with its extensive parkway. Readily accessible to the University are many of the departments of the Government, including the Department of State, the Department of the Treasury, the Department of Justice, the Department of the Army, the Department of the Navy, the Department of the Interior, the Department of Agriculture, the Department of Commerce, and the Department of Labor, as well as the National Archives, the Capitol, the Library of Congress, the National Academy of Sciences, the Pan American Union, the National Gallery of Art, and the Corcoran Gallery of Art.

GOVERNMENT

The government and general educational management of The George Washington University are vested in a self-perpetuating Board of Trustees, with the President of the University as a member *ex officio*. The members of the Board are named for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting to fill the places of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

EDUCATIONAL FACILITIES

BUILDINGS

Buildings, grounds, and equipment are valued at approximately \$19,000,000.

The buildings of the Junior College, Columbian College, the Graduate Council, the Law School, the School of Engineering, the School of Pharmacy, the School of Education, the School of Government, the College of General Studies, the Division of University Students, the Division of Special Students, the Division of Air Science, the University Hospital and Outpatient Department, and the Cancer Clinic are located between Nineteenth and Twenty-fourth Streets and between Pennsylvania Avenue and G Street NW. The School of Medicine is at Fourteenth and H Streets NW. The buildings of the University are as follows:

Chapin Hall, 2128 H Street (rear). Named in honor of the late Stephen Chapin, President of the University from 1828 to 1841. Offices and classrooms of the Air Force ROTC.

Cameron Hall, 725 Twenty-first Street. Named in honor of the late William W. Cameron, benefactor of the University and a former member of the Board of Trustees. Offices of the Treasurer, the departments of Chemistry, Electrical Engineering, and Physics; the chemistry, electrical engineering, and physics laboratories, classrooms.

Davis-Hodgkins House, 731 Twenty-second Street. Offices and lounges of engineering students' organizations.

Dwyer Hall, 2001 G Street. Drafting rooms and classrooms of the School of Engineering, Fluid Dynamics Research Project Office.

Evered's Apartments, 2224 H Street, a residence hall for nurses.

Faculty Club House, 714 Twenty-first Street.

Gymnasium, 2015-12 H Street.

Hall of Government, 710 Twenty-first Street. The gift of the late Mrs. Henry Alcock Stevens, former Trustee of the University. Offices of the Dean of the School of Government, the departments of Accounting, Business Administration, Economics, History, Political Science, and Statistics; Director of the Navy Continuing Programs, Classroom.

Harris-Brewer House, 1923 H Street. Offices of law student organizations, student building council.

Hospital House Staff Residence, 815 Twenty-second Street.

Hospital and Outpatient Department, Washington, Circle.

International House, 2110 G Street. Office of the Advisor to Students from Foreign Countries, Club House.

Lamar Auditorium, 733 Twenty-first Street. The gift of the late Abram Lister, former Trustee of the University. The Auditorium, Lamer Lounge, offices and classrooms of the Department of Speech, and the lounge-dinner.

Mechanical Engineering Building, 735 Twenty-first Street. Offices of the department of Electrical and Mechanical Engineering, engineering testing laboratories, general laboratories, drafting rooms, and classrooms.

James Monroe Hall, 2115 G Street. Offices of the Dean of the Junior College.

- the Dean of Columbian College, the Dean of the Division of University Students, the Dean of the School of Education, and the Director of the Air Force Manpower Management Training Program; the departments of Education, English (English and American Literature), Germanic Languages, Journalism, Mathematics, Philosophy, Psychology, Secretarial Studies, and Slavic Languages; classrooms.
- Office of the President, 2003 G Street. Offices of the President, Dean of Faculties, and Administrative Secretary.
- Placement Office, 2114 G Street.
- School of Medicine, 1335 H Street. Offices of the Staff of the School of Medicine; laboratories; the Medical Library; lecture rooms; classrooms; students' rooms; bookstore.
- Medical Laboratory Building.
- Research Building.
- Sorority Halls:
- 2129 G Street. Apartments of Pi Beta Phi, Chi Omega, Sigma Kappa, Alpha Delta Pi, Delta Zeta, Zeta Tau Alpha, and Kappa Kappa Gamma societies.
 - 2111 G Street. Apartment of Delta Gamma Sorority.
 - 814 Twenty-second Street. Apartment of Phi Sigma Sigma sorority.
 - 2112 G Street. Apartments of Kappa Alpha Pieta and Kappa Delta societies.
- Stanchison Hall, 707 Twenty-second Street. Named in honor of the late William Stanchison, President of the University from 1821 to 1827. Offices and laboratories of the Navy Logistics Research Project and office of the Coordinator of Scientific Activities.
- Stackman Hall, 720 Twentieth Street. Named in honor of the late Rear Admiral Charles Herbert Stackman, President of the University from 1910 to 1918. Office, library, and lecture halls of the Law School.
- Strong Residence Hall for Women, 610 Twenty-first Street. Named in honor of the donor, the late Mrs. Henry Abrah Strong, former Trustee of the University.
- Student Union, 2125 G Street. Offices of student organizations, student cafeteria and snack bar, reading room, lounge, game and music rooms, and the "Lost and Found" Office.
- University Book Store, 2120 H Street. Medical Bookstore—Room 1324 I Street.
- University Library, 2025 G Street. The gift of the late Abram Liner, former Trustee of the University. The library, rooms of the Board of Trustees, and the Graduate Council.
- The Helen L. and Mary E. Warwick Memorial Building, 2700 K Street. Diagnostic and treatment rooms, and research laboratories of the George Washington University Cancer Clinic.
- Welling Hall, 814 Twenty-second Street. Residence hall for men. Named in honor of the late James Clarke Welling, President of the University from 1871 to 1894.
- Woodhill House, 2033 G Street. Gift of the late General Maxwell Van Zandt Woodhill, former Trustee of the University. Office of the Director of Activities for Women; meeting rooms for student and alumni activities; office of the Educational Coordinator.
- Building A, 2020 G Street. Offices of the Department of Romance Languages.
- Building B, 2024 G Street. Offices, laboratories, and classrooms of the Department of Home Economics.
- Building C, 2029 G Street. Offices of the Registrar and the Director of Admissions; offices and laboratories of the departments of Biology, Botany, and Zoology; classrooms.

- Building D, 2113 G Street. Office of the Business Manager; Human Resources Research Office.
- Building F, 726 Twentieth Street. Offices of the Dean of the College of General Studies, Director of the Institute of Correctional Administration.
- Building G, 712 Twentieth Street. Offices of the Department of English (Composition section).
- Building H, 714-16 Twentieth Street. Offices and locker rooms of the Department of Physical Education for Women.
- Building I, 2133 G Street. Offices, classrooms, and laboratories of the Department of Geography.
- Buildings J and L, 2131 and 2129 G Street (rear). Classrooms and locker rooms of the Department of Physical Education for Women.
- Buildings M and N, 716-18 Twentieth Street. Office of the Dean of the School of Engineering and the Department of Civil Engineering.
- Building O, 2105 G Street. Office of the Department of Research.
- Building P, 2108 G Street. Office of the Student Health Service and the Dean of the Division of Special Studies.
- Building Q, 2009 H Street. Office of the Director of Veterans Education and the Division of Activities for Men.
- Building R, 2007 H Street. Offices of the Assistant to the President, Department of Physical Education for Men, and the Athletic Staff.
- Building T, 2117 G Street. Office of the Director of the Summer Sessions and the Department of Art, International House (and International House).
- Building U, 2005 I Street. Office of Alumni Relations and Public Relations.
- Building V, 2101 H Street. Laboratories and classrooms of the Department of Physics.
- Building W, 2108 H Street. Offices of the School of Pharmacy, pharmacy laboratory, and classrooms.
- Building Y, 802 Twenty-first Street. Offices, classroom, and laboratories of the Reading Clinic.

LIBRARY FACILITIES

The library collections of The George Washington University are housed in the University Library in Lisner Hall, the general library of the University; and in the departmental libraries of law, in Stockton Hall, and medicine, in the School of Medicine.

These collections contain approximately 260,000 volumes—230,000 in the University Library, 40,700 in the Law Library, and 13,300 in the Medical Library. Approximately 10,000 volumes a year are added to the library's resources. Endowments, supplementing the University appropriation, provide books in the fields of American civilization, American literature, foreign service, history, and public finance, and gifts from many sources have enriched the collections. The Libraries currently receive 1,400 periodicals.

In the modern University Library building, erected in 1939, on the first three floors are the delivery hall, card catalogue, reference and main reading rooms, periodical room, and reserve book rooms; on the fourth floor are ten planned seminar rooms; and on the fifth floor is the Graduate Council reading room for doctoral candidates. To the original 135-

000 volume eight tier stack of modern steel construction has just been added a similar unit of 170,000 volume capacity with 50 study carrels.

Of the special subject collections in the University Libraries, the most recent acquisition is the internationally known library of the Carnegie Endowment for International Peace, which was assembled during forty years of its activity in Washington, and was purchased by the University. The collection contains 50,000 bound volumes and 20,000 pamphlets in the fields of international law and relations, history, and economics. Other collections in the Library are the W. Lloyd Wright collection of Washingtoniana, acquired in 1950; the Richard Heinzel Collection of Germanic philology and literature; the Curt Wachsmuth Collection of Greek and Roman literature, archaeology, and history; the Mount Vernon Collection on political history, international law, and the social sciences; a representative collection of Spanish American books, the gift of the governments of Hispanic America; and the Chauncey Mitchell Depew Public Speaking Collection.

Information concerning the use of the Libraries may be obtained at the library service desks. A classified list on cards of selected recent acquisitions is available at frequent intervals, in addition to the complete information in the card catalogue. Monthly art exhibitions are held on the first and second floors of the University Library during the academic year.

The hours of the University Library and the Law Library are Monday through Friday, 9:00 A.M. to 10:00 P.M.; Saturday, 9:00 A.M. to 5:00 P.M.; Sunday, 2:00 to 6:00 P.M. The Medical Library is open Monday through Friday, 9:00 A.M. to 9:00 P.M.; Saturday, 9:00 A.M. to 1:00 P.M.

The Library is administered for the curricular, reference, and recreational needs and interests of the students. Instruction in the use of the library is given in the required English courses, and by the reference librarians. The Library endeavors to assist students and all members of the University to use the rich library resources of Washington and the unusual opportunities they offer for extensive research. Inter-library loan arrangements are maintained with other libraries in the city and in the United States.

The student has access to the Library of Congress, the Public Library of the District of Columbia and its branches, the library of the Pan American Union, the Library of the Bureau of Railway Economics, the Library of the United States Department of Agriculture, the Library of the United States Office of Education, the Armed Forces Medical Library, the Library of the Smithsonian Institution, and many of the other great special collections of the government departments.

ADMISSION

All colleges, schools, and divisions of the University accept men and women, except the Division of Air Science.

Students may enter any college, school, or division of the University, except the School of Medicine, at the beginning of the fall term, the spring term, or the summer term.

Entrance to the School of Medicine in 1955-56 is permitted only at the opening of the term beginning September 1955.

GENERAL ADMISSION REQUIREMENTS

The following factors are considered in determining the eligibility of an applicant for admission:

1. The adequacy of previous academic work as preparation for the course of study now contemplated—including quantity and quality of work and the standing of the institution in which it was done.
2. The aptitude of the student for the course contemplated.
3. The character of the student.

The University reserves the right to refuse admission to any student who has a previous academic record of such grade as to create doubt of his ability to pursue college work successfully, or who for any other reason would not be a desirable student.

APPLICATION FOR ADMISSION

An applicant for admission must obtain from the Office of the Director of Admissions an application blank which he must fill out completely and return with the application fee of \$3 (\$5 for the School of Medicine). A recent photograph, with signature, of the applicant must be attached to the blank.

An applicant for admission to the Reserve Officers' Training Corps must also fill out and return a supplemental Air Force ROTC application form.

Applications should be filed not later than July 1 for the fall term, January 1 for the spring term, and May 1 for the summer term.

An applicant from a secondary school must send the high school record form provided by the University to his high school principal with the request that the principal fill out the form and mail it directly to the Office of the Director of Admissions.

An applicant who has previously attended an institution of higher learning must request the registrar of that institution to mail directly to the Office of the Director of Admissions a transcript of his record. 11

he has attended more than one such institution he must request the registrar of each institution to send to the Office of the Director of Admissions a transcript of his record, *even though credits were not earned*, together with an honorable dismissal from the institution last attended.

The Graduate Record Examination administered by the Educational Testing Service, Princeton, New Jersey, is accepted as supplemental evidence of the applicant's educational attainment, and the appropriate report should accompany the application for admission whenever available.

METHODS OF ADMISSION

FROM SECONDARY SCHOOLS

An applicant from a secondary school may seek to qualify for admission by certificate or examination.

By Certificate

A certificate of graduation with a minimum of fifteen "units"* from an accredited secondary school and the recommendation from the principal of the secondary school that the applicant is prepared to undertake college work will be considered subject to the following conditions:

1. If the school is accredited by the regional accrediting association, the student must rank not lower than the fourth fifth of his class.
2. If the school is not listed by the regional accrediting association, but has been accredited by the state accrediting agency, the student must rank in the upper three fifths of his class.

By College Entrance Board Examinations

An applicant may qualify by passing satisfactorily College Entrance Board examinations as prescribed by the Director of Admissions. These examinations are given at a large number of examination centers throughout the United States, including Washington, D. C., on May 24, August 10, and December 3, 1955; and January 14, March 17, May 10, and August 8, 1956.

Arrangements for the examinations should be made with the College Entrance Examination Board, Post Office Box 592, Princeton, N. J., not less than one month before the date of the examinations.

FROM HIGHER INSTITUTIONS†

An applicant for advanced standing may be considered for admission upon the presentation of satisfactory credentials from an accredited

* A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 class minutes per week of prepared classroom work.

† The University reserves the right to refuse advance credit in whole or in part, or to allow it provisionally. Credit so given may be withdrawn for subsequent poor work.

institution of higher learning. The student must be in good standing as to scholarship and conduct, and must be eligible to return to the previously attended institution in the term for which he seeks admission to this University.

If the transcript of record from such an institution includes the record of his secondary school work, it is not necessary for the applicant to have forwarded a separate record directly from the principal of the secondary school. High school work is considered only as fulfilling entrance requirements; it is never credited toward advanced standing.

Properly certified courses taken at accredited colleges or universities may be applied toward a degree at this University, subject to the curriculum requirements and regulations of the school or college to which admission is sought. Work of low pass grade (such as *D* or the equivalent) will not be considered for transfer.

ENTRANCE REQUIREMENTS*

THE JUNIOR COLLEGE

An acceptable certificate of graduation from an accredited secondary school, or the satisfactory passing of College Entrance Board examinations selected with the approval of the Director of Admissions, is required. (See "Methods of Admission".)

Distribution of Units for All Curricula.—Certification by the principal that the student has satisfied all curriculum requirements of the school will be accepted in lieu of any prescribed distribution of units. Attention is called, however, to the necessity of completing stated prerequisite studies during the secondary school period for admission to certain curricula. It is to be noted that one unit of algebra is prerequisite to courses in chemistry, mathematics, physics, and statistics, and that in addition one unit of plane geometry is prerequisite to courses in mathematics and physics. In the instance of applicants who do not meet the above stated mathematics requirements, algebra and plane geometry may be taken without college credit when offered by the Department of Mathematics. For a statement of the foreign language requirements see page 63.

A desirable secondary school program in preparation for college would include: four years of English, four years of foreign language (preferably one language rather than two), two years of natural or physical science with laboratory instruction (over and beyond the so-called "General Sciences"), two or three years of social studies (with concentration on history), one or two years of basic mathematics.

* Entrance requirements are established by the faculties of the several colleges, schools, and divisions. The Director of Admissions is agent for the faculties, administers regulations governing admission, readmission, and transfer.

COLUMBIAN COLLEGE (THE SENIOR COLLEGE)

For the Bachelor's Degrees

Two years of Junior College work leading to the degree of Associate in Arts, or the lower division work in institutions not organized on the junior-senior-college plan, following a specified curriculum, meet the minimum requirements of Columbian College. In addition, however, scholarship requirements for admission may be set somewhat higher than those for graduation from the Junior College.

Bachelor of Arts.—An Associate in Arts degree based on the *Arts and Letters* curriculum in the Junior College, or the equivalent (see page 64), is required.

Bachelor of Science.—An Associate in Arts degree based on the *Science* curriculum in the Junior College, or the equivalent (see page 64), is required.

For the Master's Degrees

An approved Bachelor's degree from an accredited higher institution is required. A student from an unaccredited institution may be admitted at the discretion of the Committee on Admission and Advanced Standing, but he will be required to take such extra work above the minimum requirements as may be prescribed. An appropriate distribution of courses and a superior quality of work in the major field are essential.

Applications for admission must be approved by the department or division and by the Dean.

Master of Arts.—The student's undergraduate curriculum must have included a program of study substantially equivalent to the Bachelor of Arts major in his chosen field at this University.

Master of Science.—The student's undergraduate curriculum must have included the equivalent of the undergraduate major at this University or the scientific department under which he desires to work.

THE GRADUATE COUNCIL

Doctor of Philosophy.—The student must possess an adequate academic preparation for advanced study in the proposed field, as evidenced by approved Bachelor's and Master's degrees, or the equivalent, together with acceptable personal qualities and capacity for creative work.

THE SCHOOL OF MEDICINE

Doctor of Medicine.—Ninety credit hours of work, exclusive of physical education, in an accredited higher institution are required, as follows:

1. Chemistry, sixteen credit hours as follows: (a) eight credit hours in

general inorganic chemistry, of which at least four credit hours are laboratory work (qualitative analysis may be counted as general inorganic chemistry); (b) eight credit hours or a one-year college course of organic chemistry, including laboratory work.

2. Physics, eight credit hours, of which at least two credit hours are laboratory work. It is recommended that this course be preceded by one in trigonometry.

3. Biology, eight credit hours, of which at least four credit hours are laboratory work. This requirement may be satisfied by a course of eight credit hours in either general biology or zoology, or by four credit hours each in zoology and botany but not by botany alone.

4. English composition and literature, six credit hours, the usual introductory college course or the equivalent. The student should develop facility in speaking and writing English.

5. Modern foreign language; a reading knowledge, preferably of French or German.

6. Electives. It is recommended that the remaining credit hours required include: comparative vertebrate anatomy, botany, vertebrate embryology, qualitative and quantitative chemical analysis; social science and psychology.

Advanced Standing

A student who has satisfactorily completed one or two years at any other medical school approved by the American Medical Association, and who has the necessary preliminary educational requirements, may be admitted to advanced standing.

THE LAW SCHOOL

For the Degrees of Bachelor of Laws and Juris Doctor

Bachelor of Laws.—A Bachelor of Arts or equivalent degree awarded upon completion of a four-year course in an approved college or university is required. All pre-legal work must be of satisfactory quality and distribution. No student will be admitted who has been in attendance at another law school and who is ineligible to return to that school in good standing. From the applicants, a selection will be made by the Committee on Admissions.

Juris Doctor.—A student does not register as a candidate for the degree until his last year in the Law School. For details, see pages 119-20.

ADVANCED STANDING

Advanced standing toward the degree of Bachelor of Laws will be granted only for work successfully completed in other law schools which are members of the Association of American Law Schools.

Advanced standing will not be granted for law work already counted toward the Bachelor of Arts or other pre-legal degree.

Advanced standing toward the degree of Juris Doctor will not be granted.

For the Graduate Degrees

Master of Laws.*—A Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree from a member school of the Association of American Law Schools are required. Candidates for admission must have attained an average grade on all work done for the Bachelor of Laws degree equivalent to the relative position of a *B* average in the standards of grading at this Law School, except that, in the discretion of the Committee on Graduate Studies, applicants otherwise eligible may be admitted on proof of experience and attainment as an alternative.

Master of Comparative Law and Master of Comparative Law (American Practice).—The following are required: (1) the successful completion of and graduation from a course in arts, philosophy, letters, or sciences, equivalent to graduation from a gymnasium, lycée, or liceo; and (2) graduation in law from a recognized foreign university where training was in Civil Law.

Doctor of Juridical Science.—The following are required: a Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree, earned with high rank, from a member school of the Association of American Law Schools, and outstanding capacity for scholarly work in the field of law.

Unclassified Students

A person who is in good standing as a degree candidate in another law school which is a member of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student in order to earn credits for transfer to the other law school.

A person who is a member of the bar or a person, not a member of the bar, who is a graduate of a member school of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student.

Unclassified students are required to participate in the work of the course and take examinations. Courses taken by unclassified students will not be credited toward degrees at this Law School.

* Satisfactory completion of one-half the work required for graduation from an accredited college satisfies the pre-legal admission requirement if the applicant served not less than 24 months in the U. S. armed forces during World War II prior to September 1945.

Continuing Legal Education Students

A simplified admission and registration procedure is provided for members of the bar desiring to register as continuing legal education students to take courses on a non-credit basis. Members of the bar desiring to register as degree candidates or as unclassified graduate students should file the regular application for admission form.

THE SCHOOL OF ENGINEERING

For the Bachelor's Degrees

Bachelor of Civil Engineering. Bachelor of Electrical Engineering. Bachelor of Mechanical Engineering. Bachelor of Science in Engineering.

—An acceptable certificate of graduation from an accredited secondary school, or the satisfactory passing of College Entrance Board examinations in secondary school subjects selected with the approval of the Director of Admissions is required.

Nine and one-half of the fifteen units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one-half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. A graduate of an approved high school who does not offer for admission the particular subjects required for the engineering curriculum, but who does present not less than fifteen acceptable units, may be admitted on condition, if such deficiency in the distribution of units does not exceed two units.

ADVANCED STANDING

Advanced standing may be granted for work successfully completed at accredited institutions of higher learning. Credit will be assigned by the School of Engineering to the extent that the work taken at previous institutions meets the requirements for the degree sought at this University, and subject to the general University regulations concerning satisfactory subsequent work.

For the Master's Degrees

Master of Science in Engineering.—A Bachelor's degree in engineering from a recognized institution and evidence of capacity for productive study are required. Admission by examination may be permitted in exceptional cases.

Master of Engineering Administration.—A Bachelor's degree in engineering or science from a recognized institution, the evidence of the preparation and capacity for productive study, and acceptable supervisory or administrative experience are required.

THE SCHOOL OF PHARMACY

For the Bachelor's Degree

Bachelor of Science in Pharmacy.—An Associate in Arts degree based on the curriculum in *Pharmacy* in the Junior College (see page 65), or the equivalent is required.

A student who has received a Bachelor's degree from an accredited institution or who has completed work in the general cultural or foundational subjects of the pharmacy curriculum may be admitted to advanced standing. No more than one year of advanced standing will be granted a student from any institution other than an accredited college of pharmacy.

For the Master's Degree

Master of Science in Pharmacy.—A Bachelor of Science degree from an accredited institution is required. A superior record and professional promise are essential.

THE SCHOOL OF EDUCATION

For the Bachelor's Degrees

Bachelor of Arts in Education, Bachelor of Science in Home Economics, Bachelor of Science in Physical Education.—An Associate in Arts degree based on the *Education, Home Economics, or Physical Education* curriculum in the Junior College (see pages 65-67), or the equivalent from another accredited higher institution, or a certificate of graduation from an approved normal school or the equivalent is required. With the exception of Home Economics, applicants must be in possession of personality traits that give promise of success as a teacher.

For the Master's Degree

Master of Arts in Education.—To be admitted to candidacy for the degree of Master of Arts in Education the applicant must: (1) hold a Bachelor's degree from an accredited institution; (2) have an undergraduate quality-point index of 2.50 or above (C + average); (3) have demonstrated a genuine interest in teaching; (4) be in possession of personality traits that give promise of better-than-average success as a teacher.

To be admitted to candidacy in programs designed to prepare for service in guidance and administration two years of successful teaching experience are prerequisite.

FOR THE ADVANCED PROFESSIONAL CERTIFICATE

Advanced Professional Certificate.—The Bachelor of Arts degree in Education or the Bachelor of Science degree in Physical Education from the School of Education, or the equivalent from another institution of higher learning; a Master's degree, from an accredited institution of higher learning, at least two years of successful teaching experience, and a permanent teaching or administrative license are required.

For the Doctor's Degree

Doctor of Education.—The degree of Master of Arts in Education, or the equivalent, and at least three years of satisfactory educational experience are required.

THE SCHOOL OF GOVERNMENT

For the Bachelor's Degree

Bachelor of Arts in Government.—An Associate in Arts degree based on the *Foreign Affairs, Accounting, Business Administration, or Business and Economic Statistics* curriculum in the Junior College (see pages 67-68), or the equivalent is required.

For the Master's Degrees

A Bachelor's degree from an accredited college or university is required. A student from an unaccredited institution may be admitted at the discretion of the Committee on Admission and Advanced Standing, but will be required to take such extra work above the minimum requirements as may be prescribed.

A student admitted to candidacy must have attained a quality-point index of 3.00 (a B average) in his undergraduate major. An applicant whose scholastic average is below 3.00 in his major, or who lacks prerequisite courses, may be referred to the Division of Special Students to make up the deficiency.

Master of Arts in Government.—The applicant's undergraduate program must have included prerequisite courses, corresponding to an undergraduate major at this University, for the chosen field of graduate study.

Master of Arts in Public Administration with major fields in General Administration and in Governmental Fiscal Administration.—An undergraduate major in a social science field appropriate to the chosen field of advanced work in public administration is required.

Master of Arts in Personnel Administration.—An undergraduate major in a social science or education, with the appropriate courses in psychology, is required.

Master of Business Administration.—An acceptable undergraduate major in Business Administration, or the equivalent, is required. Apph

cants who are deficient in such course work may be admitted and will be required to make up deficiencies over and above the normal Master of Business Administration program.

For the Doctor's Degree

Doctor of Business Administration.—A Master's degree in Business Administration or a related field, or the equivalent, and proficiency in statistics and accounting to the satisfaction of the Committee on Doctoral Studies are required.

THE COLLEGE OF GENERAL STUDIES

For information concerning the College of General Studies, see pages 196-97.

THE DIVISION OF UNIVERSITY STUDENTS

Students 21 years of age or over who are not interested in working for a degree in this University may be considered for admission to the Division of University Students to take courses for which they have adequate preparation, as evidenced by previous scholastic records.

In special instances, with the permission of the instructor, a person may be considered for admission as an auditor in a class without being required to take active part in the exercises or to pass examinations, but no credit will be allowed for such attendance.

THE DIVISION OF SPECIAL STUDENTS

This is a non degree-granting division of the University in which the Director of Admissions may authorize the placement of students in the process of making up entrance deficiencies to degree-granting colleges and schools of the University.

Complete credentials must be submitted and evaluated before a tentative or definite plan of make-up may be prepared.

THE DIVISION OF AIR SCIENCE

The applicant must be a regularly enrolled, full-time, male student; a citizen of the United States; between the ages of 14 and 25; physically qualified; of good character; and a candidate for a degree.

CLASSIFICATION OF STUDENTS

Regular Students.—Regular students are those who have met the entrance requirements for candidacy and are registered for degrees.

University Students.—Persons of mature age not seeking degrees, as

specified in the rules of the Division of University Students, may be admitted to this Division to pursue courses for which they have had adequate preparation.

Special Students.—Special students are those who are in the process of qualifying for admission to curricula in degree-granting colleges and schools of this University.

Unclassified Students and Continuing Legal Education Students.—For a definition of Unclassified Students and Continuing Legal Education Students in the Law School, see pages 122–23.

Additional information concerning curricula, courses offered, entrance requirements, or admission procedure may be obtained from the Office of the Director of Admissions.

REGISTRATION

Before a student may be admitted to registration he must have satisfied the Office of the Director of Admissions that he is qualified to enter the University (see "Admission", pages 12-22).

A student who has previously matriculated in the University, but who has not been in attendance during the term prior to registration, should file an application for readmission in advance of registration.

Registration is for the term unless otherwise indicated on the registration paper. No registration is accepted for less than a term or one summer session.

A student may not register concurrently in The George Washington University and another institution without the permission of the dean of the college, school, or division in which he is registered in The George Washington University. Allowance of credit for work done concurrently will be at the discretion of the appropriate Committee on Admission and Advanced Standing.

TIME AND PLACE OF REGISTRATION

Registration for all colleges, schools, and divisions except as noted below is conducted in Building C, 2029 G Street NW., during the following periods: *fall term*, September 22 and 23; *spring term*, February 2 and 3.

For the Law School: Stockton Hall, 720 Twentieth Street NW.: *fall term*, September 22 and 23; *spring term*, February 2 and 3.

For the School of Medicine: School of Medicine, 1335 H Street NW., between 9:00 A.M. and 4:00 P.M., September 15 and 16.

For the College of General Studies: at times and places designated in individual course announcements.

REGISTRATION CHANGES AND WITHDRAWALS

For regulations governing changes in registrations and withdrawals, see pages 25, 26-27, 46-47.

FEES AND FINANCIAL REGULATIONS

By authorization of the Board of Trustees, the following fees have been adopted, effective September 1, 1955:

TUITION FEES	
For each credit hour* for which the student registers (except work in the Law School, work toward a Master's degree in Engineering, and work taken by a candidate for a Doctor's degree).....	\$16.00
For each credit hour for which the student registers in the Law School	18.00
For the degree of Doctor of Medicine, for two terms†.....	900.00
For the degree of Doctor of Philosophy, Doctor of Education, or Doctor of Business Administration:	
For work§ leading to and including the Council Fellowship or General examination|| .....	480.00
For work leading to and including the final examination||.....	480.00
For the degree of Doctor of Juridical Science:	
For work leading to and including the final examination||.....	480.00
For the degree of Master of Engineering Administration:	
For work leading to and including the Comprehensive Problem and Comprehensive Examination.....	550.00
For the degree of Master of Science in Engineering:	
For work leading to and including the Comprehensive Examination	600.00

ADDITIONAL COURSE FEES

In certain courses additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions. These fees are charged by the term and, unless otherwise indicated, may be defrayed in three payments when the tuition is paid in this manner. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee the individual student will be required to pay such additional charges as are determined by the department concerned.

GRADUATION FEES

When the degree of Associate in Arts is granted.....	\$12.00
When a degree other than the Associate in Arts degree is granted	20.00
When an Advanced Professional Certificate in Education is granted	20.00

* Payment of tuition for a Master's thesis entitles the candidate, during the academic year of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is submitted, an additional successive academic year may be granted without further tuition payment. If the preparation of the thesis extends beyond the second academic year, it must be registered for again, and tuition paid on the same basis as for a repeated course.

† Registration in the School of Medicine is for a period of two terms. After the student has entered the course of instruction he is obligated for the full tuition for two terms. No part of the tuition will be refunded upon withdrawal or dismissal for any cause.

§ This fee does not cover the cost of tuition for elementary courses (numbered 1 to 100).

|| When a limited schedule is worked which extends the time of either the preparation period or the examination period to more than one year, the proportionate part of the charge may be fixed by the Treasurer.

FEE FOR BINDING MASTER'S THESIS.....	\$5.00
FEE FOR THE PROFESSIONAL THESIS IN THE SCHOOL OF ENGINEERING... An annual fee, one half payable in advance at the time of each registration.	75.00
FEE FOR PRINTING SUMMARY OF DOCTORAL DISSERTATION.....	75.00
SPECIAL FEES	
Application fee, charged each applicant for admission (except applicants to the School of Medicine), non-refundable.....	3.00
Application fee, charged each applicant for admission to the School of Medicine, non-refundable.....	5.00
Scholastic aptitude Test (when required for admission).....	3.00
Graduate Record Examination fee (to cover two examinations), charged each candidate for a Bachelor's degree in Columbian College, the School of Engineering, or the School of Government at the time of registration for the final term of study (excluding summer sessions).....	5.00
Late-registration fee, charged each student who fails to register within the designated period.....	5.00
Withdrawal fee, charged each student who preregisters and withdraws prior to the regular registration.....	5.00
Service fee, charged each student for late payment of tuition (see "Payment of Fees").....	1.00
Reinstatement fee, charged each student who is reinstated after suspension for delinquency in fees.....	5.00
Residence fee, charged each student wishing to maintain "in residence" status during any term of absence from the University or after completion of tuition requirements: In the Law School.....	18.00
In all other colleges, schools, and divisions.....	10.00
For special physical examination.....	2.00
Student Bar Association fee, charged each student in the Law School for each term or any part thereof except the summer term.....	3.00
Engineers' Council fee, charged each student in the School of Engineering for each term or any part thereof except the summer term. For each examination to qualify for advanced standing and for each special examination.....	1.50
Laboratory check-out fee, charged each student in chemistry and physics courses who fails to check out of the laboratory by the time set by the instructor.....	5.00
Transcript fee, charged for each transcript of record after the first.....	2.00
	1.00

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record, if and when desired; (2) the services of the Placement Office; (3) the use of University library facilities, except as otherwise designated; (4) gymnasium privileges; (5) admission to all athletic contests, unless otherwise specified; (6) subscription to the *University Hatchet*, the student newspaper; (7) admission to University debates; (8) medical attention and hospital services as described under Health Adminis-

tration, pages 205-6. These privileges, with the exception of the issuance of transcripts, terminate, and a student is no longer in residence, when he withdraws or is dismissed from the University.

PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street NW. No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each term are due and payable in advance at the time of registration.

In exceptional cases, subject to the approval of the Treasurer, the student may sign a contract for term charges, except for fees payable in advance, permitting payments as follows:

Fall Term.—One third at the time of registration; one-third on November 3; one third on December 3.

Spring Term.—One third at the time of registration; one third on March 3; one third on April 3.

A student who fails to meet payments when due, but who pays his fees on or before the fifteenth of the month in which payment is due, is charged a service fee of \$1. A student who fails to meet payments by the fifteenth of the month in which payment is due will be automatically suspended and may not attend classes until he has been officially reinstated and has paid all accrued fees and a reinstatement fee of \$5.

A student suspended for failure to meet payments when due may not be reinstated for the term after two weeks from the date of suspension. Applications for reinstatement are to be made to the Office of the Cashier.

An auditor pays all fees chargeable to the student registered for credit except the late-registration fee.

WITHDRAWALS AND REFUNDS

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the dean of the college, school, or division in which the student is registered. Notification to an instructor is not an acceptable notice (see "Withdrawal", pages 46 and 47).

In authorized withdrawals and changes in schedules, financial adjustments will be made as follows:

Fall Term.—Withdrawal dated on or before October 31, cancellation of two-thirds of tuition charges; withdrawal dated on or before November 30, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to November 30.

Spring Term.—Withdrawal dated on or before February 29, cancellation of two-thirds of tuition charges; withdrawal dated on or before

March 31, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to March 31.

In no case will a refund be made of the first third of the total tuition charges unless the registration is in advance and is cancelled before the regular registration day. In this case a withdrawal fee of \$5 is charged and tuition fees refunded. In no case will tuition be reduced or refunded because of nonattendance upon classes.

Payment applies only to the term for which a registration charge is incurred and in no case will this payment be credited to another term.

Any student in chemistry who fails to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a checkout fee in the amount of \$2. A student who drops a course before the end of the term must check out of the laboratory at the next regular laboratory period.

Any student enrolled in the Air Force ROTC who fails to turn in uniforms, equipment, and textbooks, on separation from the Corps, will be charged the value of the missing items.

Authorization to withdraw and certification for work done will not be given a student who has not a clear financial record.

FELLOWSHIPS, SCHOLARSHIPS, PRIZES, FINANCIAL AID

FELLOWSHIPS AND GRADUATE ASSISTANTSHIPS

The following fellowships and graduate assistantships are available. Applications should be submitted not later than April 1 preceding the period for which the award is to be made.

University Teaching Fellowships.—These are assigned for the academic year to the various departments of instruction. The applicant is expected to be a prospective candidate for a Doctoral degree, and to have a Master's degree or equivalent in the general field of his future doctoral study. Each Teaching Fellow receives an annual stipend (on a nine-month basis) of up to \$1,350 plus full tuition for whatever schedule of study or research his fellowship duties permit him to carry. The University Teaching Fellow normally renders half-time service in classroom or laboratory assignments to the department of instruction directing his doctoral study. Application forms for these fellowships may be obtained from the executive officer of the department concerned.

Graduate Teaching Assistantships.—These are open in various departments of instruction to candidates for the Master's degrees. Each graduate teaching assistant renders a designated unit of service to his major department of instruction, and receives, depending upon his teaching or laboratory assignment, up to \$1,215 on a nine-month basis plus tuition for the program of studies which the duties of his assistantship permit him to carry. Application should be made to the executive officer of the department of instruction concerned.

Law School Teaching Fellowships.—A limited number of teaching fellowships are available each year in the Law School to prospective candidates for the Master of Laws degree. Each fellow receives an annual stipend plus tuition for the academic year. The occupant of each of these fellowships follows an approved program of study and research, assists members of the Faculty in the guidance of first year students, and supervises student work in legal bibliography and the drafting of legal instruments. Upon satisfactory completion of the year's work, a fellow is recommended for the degree of Master of Laws. Applications should be submitted to the Dean of the Law School not later than March 1 preceding the period for which the fellowship is to be awarded.

Special Fellowships.—Special fellowships are supported by endowment, and are awarded to candidates or prospective candidates for the degree of Doctor of Philosophy of unusual promise and ability. The stipend is

not fixed but varies in amount with the need of the individual receiving the award. In applying for one of these fellowships it is advantageous that the student appear personally for an interview with the Chairman and such other members of the Graduate Council as would be interested in the research investigations proposed. These fellowships include the following:

Isabella Osborn King Research Fellowships.—Two fellowships of the value of \$1,500 each, offered annually in the general field of biology, and intended to foster research for which the libraries and scientific establishments in Washington provide special facilities.

Thomas Bradford Sanders Fellowships.—Established in 1928 by Miss Addie Sanders in memory of her brother, Thomas Bradford Sanders, and offered in various academic fields of study.

SCHOLARSHIPS

Scholarships are awarded for two terms unless otherwise specified and are credited in equal parts for each term. Each holder must carry a full schedule of academic work (fifteen credit hours or in the professional schools the full prescribed schedule) during the period for which the scholarship is awarded. Applicants* must have established an academic record in courses at this institution, and should apply on prescribed forms which must be filed in the Office of the Chairman of the Committee on Student Loans and Scholarships not later than April 1 preceding the academic year for which the scholarship is to be awarded. Further information may be obtained from the Chairman of the Committee on Scholarships.

Alpha Zeta Omega Scholarship.—This scholarship, in the amount of \$500, was established by Pi Chapter of Alpha Zeta Omega Pharmaceutical Fraternity. It is awarded annually to a member of the graduating class of one of the public high schools of the District of Columbia and nearby Maryland and Virginia who intends to enroll in the Junior College Pharmacy Curriculum and to continue in the School of Pharmacy, completing the work leading to the degree of Bachelor of Science in Pharmacy.

Alumni Scholarships.—Five scholarships are available each year in the Junior College, upon the recommendation of regional alumni clubs, to outstanding male graduates of accredited high schools. The scholarships cover tuition costs for four terms (beginning with the fall term) of full-time work but do not include special fees such as laboratory charges, room, board, or other expenses. To retain the scholarship, the student

* Except in the case of the Alpha Zeta Omega Scholarship, the Alumni Scholarships, the Alpha Omega Scholarship, the D. C. Pharmaceutical Association Scholarship, School of Engineering Scholarships, General Motors College Scholarship, the High School Scholarships, the Kappa Alpha Pieta Scholarship, the Law School Scholarships, the Eugene and Agnes E. Meyer Scholarships, the National League of Massie Clubs Scholarship, the John O. Rankin Scholarship, and the Student Activities Scholarships.

must maintain a *B* average. Additional information may be obtained from the Director of Alumni Relations.

American Foundation for Pharmaceutical Education Scholarship.—A scholarship fund, in the amount of \$400, established by the American Foundation for Pharmaceutical Education, is available annually to junior and senior students of the School of Pharmacy who are in the upper quarter of their class or who are maintaining average grades of not less than *B*. The scholarship funds are awarded on the recommendation of the Committee on Scholarship of the School of Pharmacy.

American Society of Women Accountants.—This scholarship, in the amount of \$100, established in 1953 by the District of Columbia Chapter of the American Society of Women Accountants, is available to a junior, senior, or postgraduate woman majoring in accounting whose academic record is good and who needs aid in continuing her education.

Byron Andrews Scholarship.—This scholarship, in the amount of \$250, established in 1920 by Mrs. Belle Fisk Andrews in memory of her husband, Byron Andrews, is available "for ambitious and needy students, who desire to pursue courses in English, Latin, journalism, history, literature, or political science".

Anna Bartsch Scholarship.—This scholarship, in the amount of \$500, established in 1946 by Dr. Anna Bartsch-Dunne, as a memorial to her mother, Anna Bartsch, is available to a woman in the School of Medicine, "of outstanding scholarship, character, and promise, who intends to make the practice of medicine her life profession". The award is made upon the recommendation of the Faculty of the School of Medicine.

Everett Lamont Bradley Scholarship.—This scholarship, in the amount of \$100, established in 1954 by bequest of Alice R. H. Bradley in memory of her son, Everett Lamont Bradley, is available to a student in the School of Medicine.

Emma K. Carr Scholarships.—Six scholarships in the amount of \$400 each and eight of \$100 each, established in 1932 by Mrs. Emma K. Carr, are available to "young men (of the white race) for undergraduate or postgraduate work, considering character, capacity, and need".

Henry Harding Carter Scholarship.—This scholarship, in the amount of \$400, established in 1896 by Mrs. Maria M. Carter in memory of her husband, Henry Harding Carter, is available to a deserving student who is preparing for the civil-engineering profession.

Maria M. Carter Scholarship.—This scholarship, in the amount of \$100, established in 1871 by Mrs. Maria M. Carter, is available to a young man.

Chi Omega Alumnae Association Scholarship.—This scholarship, in the amount of \$200, established in 1954 by the Washington, D. C. Chi Omega Alumnae Association, is awarded annually to a student who desires to major in speech correction and who is in need of financial assistance in order to complete the prescribed course.

Daughters of the American Revolution Scholarship.—This scholarship, in the amount of \$350, established in 1952 by the District of Columbia Daughters of the American Revolution, is available to junior and senior students who are descendants, preferably female, of patriots of the American Revolution.

Isaac Davis Scholarship.—This scholarship, in the amount of \$80, was established in 1869 by the Honorable Isaac Davis of Massachusetts. Nominations for the scholarship may be made "by the founder or his eldest lineal descendant". In case no such nomination is made, the scholarship is to be awarded by the University.

District of Columbia Pharmaceutical Association Scholarship.—This scholarship, in the amount of \$500, was established in 1954. It is awarded annually to a member of the graduating class of one of the public or parochial high schools of the District of Columbia and near-by Maryland and Virginia who intends to enroll in the Junior College Pharmacy Curriculum and to continue in the School of Pharmacy, completing the work leading to the degree of Bachelor of Science in Pharmacy.

Charles Worthington Dorsey Memorial Scholarship.—This scholarship, established in 1947 as a memorial to Charles Worthington Dorsey, Bachelor of Laws, '81, Master of Laws, '82, is awarded upon the recommendation of the Faculty of the Law School to a needy and promising graduate of Columbian College or other division of the University, with a Bachelor of Arts or other equivalent degree, who has maintained an average of B as an undergraduate student and who desires to pursue the study of law as a full-time student. The scholarship covers tuition for the course leading to the first degree from the Law School, Bachelor of Laws or Juris Doctor, provided that the holder maintains an average of B. The right is reserved to suspend the benefits of the scholarship for cause at any time. This scholarship is awarded ordinarily once every three years.

School of Engineering Scholarships.—Four scholarships, established in 1952, are available each year in the School of Engineering to graduates of accredited secondary schools. Each scholarship provides full tuition for one year. The holders of these scholarships must carry a full program in the School of Engineering.

Henry Parsons Erwin Scholarship.—This scholarship, in the amount of \$200, established in 1955 by Mrs. Helen B. Erwin as a memorial to her husband, Henry Parsons Erwin, a former Trustee of the University, is available for a student in Engineering.

Robert Farnham Scholarship.—This scholarship, in the amount of \$75, given to the University in 1871 by Mrs. Robert Farnham, is available to a student in Columbian College.

General Motors College Scholarship.—This scholarship, established in 1955 by General Motors Corporation, is available for an incoming freshman student who is a citizen of the United States and demonstrates

outstanding talent, high personal qualifications, and financial need. The amount of the award has been made flexible and will range from an honorary award of \$200, up to an award of \$2,000 per year, depending upon the demonstrated need of the individual. It is renewable for the four years of undergraduate work, provided the student continues to meet the high standards established for the holder of this award.

Anna Spicker Hampel Scholarship.—This scholarship, in the amount of \$40, established in 1949 by Mrs. Evelyn Hampel Young, is available for scholarship aid to young married women students in the School of Education or Columbian College.

Elma Lewis Harvey Scholarship.—This scholarship of \$150 was founded in 1921 by Mrs. Emma Elizabeth Harvey in memory of her daughter, and is awarded every four years, or as often as vacant, to a young woman in Columbian College of the Protestant faith and the Caucasian race who shall be selected for scholarship and moral qualifications.

Hazleton Scholarship.—This scholarship, in the amount of \$300, established in 1950 by the bequest of Lillie S. Hazleton, is awarded annually "for the use and assistance of needy and worthy students".

High School Scholarships.—The Board of Trustees of the University offers the following scholarships for study in the liberal arts to graduates of public high schools of the District of Columbia and near-by Maryland and Virginia. District of Columbia: Anacostia, Coolidge, Eastern, McKinley, Roosevelt, Western, and Woodrow Wilson high schools—two scholarships each (The Amos Kendall Scholarship, established by the late Honorable Amos Kendall, is one of the two assigned to Western High School.); Montgomery County, Maryland—four scholarships; Prince Georges County, Maryland—four scholarships; Alexandria County, Virginia—two scholarships; Arlington County, Virginia—four scholarships. Scholarships are divided equally between men and women.

Each scholarship is awarded annually to a member of the graduating class who plans to enter the Junior College and continue in Columbian College, completing the work leading to a Bachelor's degree. A principal and an alternate may be recommended. The principal or, if the principal declines, the alternate must register the following September.

The holders of these scholarships are exempt from tuition fees, but are charged laboratory, graduation, and other fees. The scholarships are valid for four academic years of undergraduate study.

To retain any high school scholarship, a student must carry a full program of study in the liberal arts (a full program being defined as at least fifteen hours of work each term). An average of B and a high standard of deportment must be maintained. Scholarships are reassigned annually. If the holder fails to continue its use during the academic year, the scholarship will not be reassigned.

High School Discussion Conference Scholarships.—Three scholarships are available each year in the Junior College to high school seniors who participate in the George Washington University High School Discussion Program. These scholarships cover tuition for one year, but do not include laboratory fees or other special fees. For information concerning application, consult the Department of Speech.

Kappa Alpha Theta Scholarship.—This scholarship, in the amount of \$500, established by the Washington alumnae of Kappa Alpha Theta, is available for the training of a clinician in speech correction.

Kappa Psi Scholarship.—This scholarship, in the amount of \$75, was established in 1952 by Gamma Tau Chapter of Kappa Psi Pharmaceutical Fraternity. It is awarded annually to a student in the School of Pharmacy who is in need of financial aid.

Law School Scholarships.—Seven scholarships are available each year in the Law School to graduates of accredited colleges. Each scholarship provides full three-years' tuition in the morning division of the Law School. Candidates must have graduated in the upper fifth of their class and must have demonstrated qualities of leadership in addition to scholastic attainment. To retain the scholarship, the successful candidate must maintain a *B* average. Application must be made before February 1 to the Dean of the Law School.

Eugene and Agnes E. Meyer Scholarships.—A scholarship fund, in the amount of \$2,500, established in 1952 by the Eugene and Agnes E. Meyer Foundation, is available annually "to assist promising students or applicants in meeting the costs of furthering their education, with preferential consideration to children of persons who are employed in public service, including service in the armed forces or the judiciary."

A. Morehouse Scholarship.—This scholarship was established by Mr. A. Morehouse in 1861. It carries an annual stipend of \$200, which is available for an undergraduate "intending to enter the Christian ministry".

The National League of Masonic Clubs Scholarship.—This scholarship, in the amount of \$450 annually to be applied toward payment of tuition costs only, is offered by the National League of Masonic Clubs. It is awarded every four years, or as often as vacant, to the son or daughter of a Master Mason who is a member of a Masonic Club affiliated with the National League of Masonic Clubs. To continue to hold the scholarship, the student must maintain a satisfactory academic record.

Newspaper Scholarships.—One scholarship is available each year to a candidate recommended by each of the following newspapers: *The Washington Daily News*, *The Washington Post and Times Herald*, and *The Evening Star*. The holder of the scholarship must be an employee of the newspaper. These scholarships are valid for four academic

years, provided the holder continues in the employ and is recommended by the newspaper, and maintains a satisfactory academic record and a high standard of deportment. They cover tuition but do not include laboratory fees, graduation fees, or other special fees.

Panhellenic Association of Washington, D. C., Scholarship.—A scholarship, in the amount of \$200 to be applied to tuition fees, has been established by the Panhellenic Association of Washington, D. C. This scholarship is available annually to a woman student in her sophomore or junior year, who is a member of a National Panhellenic Conference sorority, has done the most to promote good social relations among the sororities on the campus, is an outstanding leader in student affairs sponsored by the University, and has a 2.5 (C +) or better average.

Paul Pearson Scholarship.—This scholarship, in the amount of \$200, established in 1940 by bequest of Paul Pearson and "to be known as the Dr. Paul Pearson award", is available to a student in the School of Pharmacy, upon the recommendation of the Faculty of that School.

John O. Rankin Scholarship.—This scholarship, established in October 1951 in recognition of Mr. Rankin's bequest to the University, is to be awarded to a resident of Pemiscot County, Missouri, upon the recommendation of the Caruthersville Rotary Club and the Hayti Lions Club in this County. The scholarship covers tuition costs for the four-year curriculum in Foreign Affairs, but it does not include laboratory fees, graduation fees, or other special fees. To retain the scholarship, the recipient must carry a full program and maintain an average of B. The scholarship is awarded every four years or as often as vacant. Further information may be obtained from the Office of the President of the University.

Lula M. Shepard Scholarships.—Two scholarships, in the amount of \$450 and \$300, respectively, established in 1940 by bequest of Lula M. Shepard, are available to "worthy Protestant students desiring to enter the Foreign Service Department of the School of Government".

David Spencer Scholarship.—This scholarship of \$150, established in 1918 by Miss Louisa J. Spencer, is available under certain restrictions.

Mary Lovell Stone Scholarship.—This memorial scholarship, in the amount of \$200, established in 1893, is available to a woman student of science in Columbian College.

Student Activities Scholarships.—The University has established a limited number of Activities Scholarships for men, which are awarded to approved applicants by the Faculty Committee on Scholarships upon the basis of (1) need, (2) good character, (3) demonstrated aptitude for leadership, and (4) scholarship.

Such scholarships are granted for one academic year. They may be continued, however, upon the basis on which they were granted. Recipi-

ents of Activities Scholarships must maintain the required scholastic average of the school or division in which they are registered.

The time for filing applications for Activities Scholarships and the terms of such scholarships may be ascertained by inquiry at the office of the Chairman of the Committee on Scholarships.

Charles Clinton Swisher Scholarships.—These scholarships, in the amount of \$400 and \$200 respectively, established in 1941 by Professor Charles Clinton Swisher, are available, under certain conditions, to students of medieval history.

William Walker Scholarship.—This scholarship, established in 1824 by William Walker, Esq., carries an annual stipend of \$100, which is available for an undergraduate intending to enter the Christian ministry.

John Withington Scholarship.—This scholarship of \$150 was established in 1830 by the New York Baptist Theological Seminary.

Ellen Woodhull Scholarship.—This scholarship of \$50, established by Ellen M. E. Woodhull, is available to a student in Columbian College.

The Zonta Club of Washington, D. C., Scholarship.—This scholarship, in the amount of \$300, offered by the Zonta Club of Washington, D. C., is available to a woman who is a senior or graduate student with special interest in a professional or business career.

THE COLUMBIAN WOMEN SCHOLARSHIP FUNDS

The Columbian Women Scholarships are awarded by the Scholarship Committee of the Columbian Women. Applications for these scholarships should be addressed to the Chairman of the Scholarship Committee, the Columbian Women, The George Washington University, Washington 6, D. C., not later than May 15 preceding the academic year for which the scholarship is to be awarded, or, in the case of award for the spring term, not later than January 1.

Nellie Maynard Knapp Scholarship Fund.—The income from this fund of \$5,000, established in 1915 in memory of a former president, Mrs. Martin A. Knapp, is available for scholarships for women.

Founders of Columbian Women Scholarship Fund.—The income from this fund of \$5,000, established in 1920, is available for scholarships.

Lillian Young Herron Scholarship Fund.—The income from this fund of \$5,000, established in 1925 and named in 1930 in memory of a former president, is available for scholarships.

Elizabeth V. Brown Scholarship Fund.—This fund of \$1,200 was established in 1925 by the College Women's Club of Washington, D. C., in memory of the late Elizabeth V. Brown. The income is available for a scholarship for a woman student in the School of Education.

College Women's Scholarship Fund.—The income from this fund of \$500, established in 1926 by the College Women's Club of Washington, D. C., is available for scholarship aid.

Lewes D. and Myrtie H. Wilson Memorial Scholarship Fund.—This fund of \$1,000 was established by Miss Elizabeth Wilson in 1926 as a memorial to her parents, Lewes D. and Myrtie H. Wilson. The income is available for a scholarship in the School of Medicine.

Grace Ross Chamberlin Scholarship Fund.—The income from this fund of \$2,300, established in 1932 in honor of a former president, is available for scholarship aid.

Janet M. William Scholarship Fund.—The income from this fund of \$1,000, established in 1954 in honor of a former president, is available for scholarship aid.

PRIZES

Alpha Chi Sigma Prizes.—Alpha Pi Chapter of Alpha Chi Sigma Fraternity offers annually the following prizes:

A "Handbook on Chemistry and Physics" is awarded to each of the three students who carry at least eighteen credit hours during the freshman year and attain the highest averages in freshman chemistry.

The name and year of graduation of the student who has attained the highest quality-point index in courses in chemistry will be inscribed on a bronze plaque. The winner must have had at least sixteen hours of chemistry including the final term at The George Washington University.

Alpha Delta Pi Prize.—Alpha Pi Chapter of Alpha Delta Pi Fraternity offers an annual prize of \$10 to the woman member of the junior class with the most outstanding record in scholarship, extra-curricular activities, and service to the University.

Alpha Kappa Psi Prize.—Beta Mu Chapter of Alpha Kappa Psi Fraternity awards annually a key to the male student who has completed ninety credit hours at The George Washington University and has attained the highest average grade in economics, business administration, public accounting, public finance, and foreign commerce.

Alpha Zeta Omega Prize.—The Ladies' Auxiliary, Pi Chapter, of the Alpha Zeta Omega Pharmaceutical Fraternity offers annually a copy of *The United States Dispensatory* to the freshman student in pharmacy who has completed at least fifteen hours in the University and who has attained the highest average in his courses.

American Institute of Chemists Prize.—The District of Columbia Chapter of the American Institute of Chemists offers an annual prize of a medal and junior membership in the American Institute of Chemists to that graduating student, majoring in chemistry, who excels in scholarship and in the personal qualities of integrity and leadership.

Byrne Thurtell Burns Memorial Prize.—This prize of \$75 is awarded to the senior majoring in chemistry who shows the greatest proficiency in organic chemistry, as evidenced by a comprehensive examination, and

who possesses such qualifications of mind, character, and personality as to give promise of future achievement.

Martin L. Cannon Memorial Prize.—Pi Chapter of the Alpha Zeta Omega Pharmaceutical Fraternity offers annually a copy of *The United States Dispensary*, in memory of Dr. Martin L. Cannon, to the student in pharmacy receiving his Associate in Arts degree, who throughout his course has obtained the highest grades and at the same time contributed most to the student activities in the School of Pharmacy.

Chi Omega Prize.—Phi Alpha Chapter of Chi Omega Fraternity offers annually a prize of \$25 to be awarded to the woman student in the graduating class with the highest record in the following social sciences: economics, sociology, political science, and history; combined with general excellence.

John Henry Cowles Prizes.—These prizes, founded in 1943 by John H. Cowles, Grand Commander of the Supreme Council of the Thirty-third Degree (Mother Council of the World) of the Ancient and Accepted Scottish Rite of Freemasonry, Southern Jurisdiction of the United States of America, are awarded annually to the best two scholars in the senior class of the School of Government. The prizes are as follows: first prize, \$100; second prize, \$50.

DeWitt Clinton Croissant Prize.—This prize of \$50, established by the late Professor DeWitt Clinton Croissant, is awarded annually to the undergraduate student who as a member of one of the University courses in drama or as a participant in University dramatics submits to the English Department the best essay on drama or the theatre.

E. K. Cutter Prize.—The E. K. Cutter Prize in English was established by the late Marion Kendall Cutter "for excellence in the study of English." An annual prize of \$60 is awarded to the member of the graduating class whose record in English, combined with general excellence, shows most marked aptitude for and attainment in English studies.

Daughters of the American Revolution Prize.—This prize established by the Daughters of the American Revolution of the District of Columbia, consists of \$15, which is awarded annually to the student who, having maintained a record of distinction in American history, submits the best essay upon a topic in the period of the American Revolution.

Isaac Davis Prizes.—These prizes, established by the Honorable Isaac Davis, of Massachusetts, in 1847, are awarded annually to such members of the senior class as shall have made the greatest progress in public speaking during their connection with the University. The prizes are as follows: first prize, \$25; second prize, \$20; third prize, \$15.

The award of these three prizes is determined by a public speaking contest in which the participants deliver original orations. Only members of the senior class who are candidates for the degree of Bachelor of Arts or Bachelor of Science are eligible to compete.

Delta Zeta Prize.—Delta Zeta Sorority offers annually a prize of \$10 to be awarded to the student maintaining the highest average in Zoology 1-2.

Ellsworth Prize.—The Ellsworth Prize of \$25, established by the late Mr. Fritz von Briesen, is awarded to the student doing the best work in the subject of Patent Law Practice.

Elton Prize.—The Elton Prize of \$30, established by the Reverend Romeo Elton, of Exeter, England, is awarded annually to the senior student having the highest average in the Greek language and literature.

Jesse Frederick Essary Prize in Journalism.—This memorial prize of \$150, established in 1948 by the late Helen Essary Murphy, is awarded annually to a student who has given promise of sound citizenship and ability in "forthright reporting" in student publication and/or under the jurisdiction of the Department of Journalism. The selection of the recipient will be made by a committee composed of the President of the University and two members of the Faculty.

Joshua Evans III Prize in the Political and Social Sciences.—This memorial prize of \$70, established by friends because of an outstanding life, is awarded annually to that man in the graduating class of The George Washington University "who has demonstrated his signal ability in the social and political sciences and who has given promise of the interpretation of that ability in good citizenship among his fellows". The selection of the recipient will be made by the President of the University and a committee from the Faculty of the Division of the Social Sciences.

Willie E. Fitch Prize.—The Willie E. Fitch Prize of \$75, established in 1883 by James E. Fitch, in memory of his son, is awarded annually to a senior student for the best examination in chemistry.

Alice Douglas Goddard Prize.—This prize of \$75 was established in 1941 by Frederick Joseph Goddard of Georgetown, D.C., in memory of Alice Douglas Goddard, and is awarded annually to the upper division student making the highest average in American literature.

Edward Carrington Goddard Prize.—This prize of \$75 was established in 1923 by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Georgetown, D.C., in memory of Edward Carrington Goddard, class of '81, and is awarded to the junior or senior student making the highest average in the French language and literature.

James Douglas Goddard Prize.—This prize of \$75 was established in 1923 by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Georgetown, D.C., in memory of James Douglas Goddard, class of '01, and is awarded to the senior student making the highest average in pharmacy.

Morgan Richardson Goddard Prize.—This prize of \$75, was established in 1923 by Mary Williamson Goddard, Alice Douglas Goddard,

and Frederick Joseph Goddard, of Georgetown, D.C., in memory of Morgan Richardson Goddard, and is awarded to the junior or senior student making the highest average in the following fields: economics, business administration, foreign commerce, and public accounting.

Gardiner G. Hubbard Memorial Prize in United States History.—This prize of \$60 was established by Mrs. Gertrude M. Hubbard in memory of her husband, the late Gardiner G. Hubbard, and is awarded annually to that member of the graduating class majoring in history who has maintained the highest standing in courses in United States history.

Kappa Kappa Gamma Prize.—Kappa Kappa Gamma Sorority offers annually a prize of \$10 to the full-time freshman who achieves the best record in Botany 1 and 2.

John Bell Larner Prize.—This prize, established by the bequest of John Bell Larner, consists of a medal which is awarded annually to that member of the graduating class in the Law School who attains the highest average grade in the entire course for the degrees of Bachelor of Laws or Juris Doctor.

Martin Mahler Prize in Materials Testing.—This prize established in 1953 by Martin Mahler consists of a one year membership in the American Society for Testing Materials and is awarded to the upper division or graduate student in engineering who submits the best reports on tests in the Materials Laboratories course with preference given to prestressed concrete tests.

Mortar Board Prize.—This prize, consisting of a silver cup, is awarded annually to the woman student in the sophomore class having a scholarship average of B or higher and the most outstanding record in activities.

Omicron Delta Kappa Prize.—Alpha Delta Circle of Omicron Delta Kappa Fraternity offers annually a plaque to be awarded to "that member of the senior class who throughout his course has done the most constructive work in the furtherance and upbuilding of the University student activities".

John Ordronaux Prizes.—These prizes were established in 1900 by the bequest of John Ordronaux.

The amount of \$150 is awarded to the member of the graduating class in the School of Medicine who has the highest scholastic standing.

The amount of \$75 is awarded annually to the student in the Law School who has attained the highest average grade in the first year, full-time course; and \$75 to the student who has attained the highest average grade in the second-year, full-time course.

Phi Eta Sigma Prize.—The George Washington University Chapter of Phi Eta Sigma offers annually to the male student attaining the highest scholastic average in his first full term of work, a choice book

selected from the field of the recipient's major interest. The winner's name will be engraved on a plaque in the Office of the Dean of the Junior College.

Phi Sigma Kappa Prize.—Phi Sigma Kappa Fraternity offers annually an engraved silver cup to the winner of an oratorical contest, open to all freshmen.

Pi Beta Phi Prize.—A prize of \$20 is awarded annually by the District of Columbia Alpha Chapter of Pi Beta Phi Fraternity to that woman member of the senior class who throughout her college course has done the most constructive work in the promotion of student activities among the women of the University.

Psi Chi Prizes.—The George Washington University Chapter of Psi Chi, national honorary society in psychology, offers annually two awards in the field of psychology: the first, \$25 to the best undergraduate student in Experimental Psychology; the second, \$25 to the graduate student submitting the best Master's thesis in Psychology.

Ruggles Prize.—The Ruggles Prize of \$35, established by Professor William Ruggles in 1859, is awarded annually to a candidate for a baccalaureate degree for excellence in mathematics.

Sigma Kappa Prize.—Zeta Chapter of Sigma Kappa Sorority offers an annual prize of \$10 to the student with the highest grade in the final examination in General Chemistry.

Sigma Tau Prize.—Xi Chapter of Sigma Tau Fraternity offers annually a medal to be awarded to that member of the freshman class in the School of Engineering who maintains the highest scholastic standing in the work of the entire year.

Society of Colonial Wars in the District of Columbia Prize.—This award, in the form of a gold medal, established in 1953 by the Society of Colonial Wars in the District of Columbia, is to be awarded to a candidate for a graduate degree who, in the judgment of the Faculty of the Department of History, submits a thesis or dissertation demonstrating excellence in historical research in American Colonial history. The University reserves the right to withhold the award if no thesis or dissertation attaining the required degree of excellence is submitted.

Staughton Prize.—The Staughton Prize of \$30, established by the Reverend Romeo Elton, is awarded annually to the senior student making the best record in the Latin language and literature.

James MacBride Sterrett, Jr., Prize.—This prize, established in 1911 by Professor James MacBride Sterrett in memory of his son, consists of books awarded annually to that student who obtains the highest average in Physics 6, 7, and 8.

Charles Clinton Swisher Historical Club Prize.—This prize of \$100, established in 1936 by the Charles Clinton Swisher Historical Club and augmented in 1941 by the bequest of Professor Charles Clinton Swisher,

is awarded annually to the student who submits the best essay covering some phase of medieval history.

Theta Tau Activities Plaque.—Gamma Beta Chapter of Theta Tau Fraternity offers annually a plaque to be awarded to that member of the senior class who has the most outstanding record in activities in the School of Engineering during the entire period of his attendance.

Thomas F. Walsh Prize.—This prize of \$150, established in 1901 by Thomas F. Walsh, is awarded annually to that student who submits the best essay in Irish history.

Washington Personnel Association Prize.—The Washington Personnel Association awards annually a certificate and \$25 to an outstanding graduating senior in business administration who shows general excellence in studies, demonstrates superiority in one or more courses in personnel administration, and shows qualities of leadership or promise through extra-scholastic activities.

Alexander Wilbourne Weddell Prize.—This prize of \$350, established in 1923, by Mrs. Virginia Chase Weddell, is awarded annually to a candidate for a degree who writes the best essay on the subject of "the promotion of peace among the nations of the world". The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

MILITARY AWARDS

Air Force Association Silver ROTC Medal.—This medal, offered by the Air Force Association, is awarded annually to the Air Force ROTC Cadet of the senior class who, after completion of summer camp, is judged to be the outstanding cadet among those physically qualified for flying training who have indicated their intention to apply for such training upon graduation.

Reserve Officers' Association Gold ROTC Medal.—This gold medal, offered by the Reserve Officers' Association of the District of Columbia, is awarded annually to the Air Force ROTC Cadet of the junior class with the highest grades in the leadership and academic phases of the Air Force ROTC course for the current year.

Reserve Officers' Association Silver ROTC Medal.—This silver medal, offered by the Reserve Officers' Association of the District of Columbia, is awarded annually to the Air Force ROTC Cadet of the sophomore class with the highest grades in the leadership and academic phases of the Air Force ROTC course for the current year.

Reserve Officers' Association Bronze ROTC Medal.—This bronze medal, offered by the Reserve Officers' Association of the District of

Columbia is awarded annually to the Air Force ROTC Cadet of the freshman class with the highest grades in the leadership and academic phases of the Air Force ROTC course for the current year.

Reserve Officers' Association Junior Memberships.—Five junior memberships, offered by the Reserve Officers' Association of the District of Columbia, are awarded annually to the five Air Force ROTC Cadets of the junior class who obtain the highest grades for the first term in the academic phase of the Air Force ROTC course, Air Science III (101).

Pershing Rifles Achievement Medals.—These medals offered in gold, silver, and bronze are awarded periodically by the National Headquarters of the Pershing Rifles to those active Pershing Riflemen in the Advanced Air Force ROTC course who are judged by their cadet officers, faculty administration, and the Professor of Air Science to be outstanding examples of the ideals of the Pershing Rifles.

The Armed Forces Chemical Association Annual Award.—This award consisting of a scroll and a medal is offered by the Armed Forces Chemical Association annually to selected Air Force ROTC cadets majoring in chemistry or chemical engineering in their junior year. Nominations are made by the Director of Air Science and final selection is made by a board of three senior Air Force Officers.

Society of American Military Engineers Gold Medal.—This medal with Key Replica, offered by the Society of American Engineers, is awarded annually to selected Air Force ROTC Cadets in the next-to-last year of their engineering course and in the last year of such course. Nominations are made jointly by the Director of Air Science and the Dean of engineering, and final selection is made by a board of three senior Air Force officers.

Conair Trophy.—This trophy, a replica of one of the nation's most modern aircraft, offered by Consolidated Vultee Aircraft Corporation is awarded annually to the Air Force ROTC Cadet attaining the highest cumulative grade in Air Science III and IV among the cadets applying for flying training.

FINANCIAL AID

INTERNSHIP

In memory of her mother, Anna Bartsch, Dr. Anna Bartsch Danner established in 1946 a fund which provides \$15 a month to aid in the support of an internship in the University Hospital.

LOAN FUNDS

The following loan funds are available to students in the University in accordance with the qualifications placed thereon by the donors. Inquiries should be directed to the Office of the Treasurer.

University Loan Fund.—The Trustees of The George Washington University have established a loan fund of \$10,000.

Home Economics Loan Fund.—This fund of \$382.35, contributed by the D. C. Home Economics Association, is available for loans to senior girls majoring in Home Economics.

Kellogg Medical School Loan Fund.—The W. K. Kellogg Foundation in Battle Creek, Michigan, has established a fund of \$18,899.82 for loans to students in the School of Medicine.

Law Association Loan Fund.—The George Washington Law Association has established a loan fund in the amount of \$853.15 for loans to students in the Law School.

School of Medicine Loan Fund.—This fund of \$1,227.42, contributed by medical students, is available for loans to students in the School of Medicine.

Pfizer Medical School Loan Fund.—The Chas. Pfizer & Co., Inc., has established a fund of \$1,000 for loans to students in the School of Medicine.

Benjamin Schoenfeld Memorial Pharmacy Loan Fund.—This fund, established by the family and friends of Benjamin Schoenfeld, in the amount of \$1,067, is available for loans to students studying pharmacy.

Henry Strong Educational Foundation.—The Henry Strong Educational Foundation, established at Chicago under the will of General Henry Strong, makes available a fund for loans to both men and women students under the age of twenty-five years.

Henry Strong-William A. Maury Loan Fund.—This fund, also allocated from the funds of the Henry Strong Educational Foundation, is to be loaned to students under the age of twenty-five years in the George Washington University Law School.

Sutherland Medical School Loan Fund.—This fund, in the amount of \$1,360 and established by Mrs. Rose L. Sutherland, is available for loans to students in the School of Medicine.

REGULATIONS

A student enrolled in the University is required to conform to the University regulations and to comply with the rules and regulations of the college, school, or division in which he is registered.

A student who withdraws or is suspended, or is otherwise absent from the University for one term or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be canceled and he will be ineligible (except by special action of the Faculty) for subsequent registration in any unit of the University.

ATTENDANCE

A student is not permitted to attend classes until registration has been completed and fees due have been paid. Regular attendance is required. A student may be dropped from any course for undue absence.

A student who has been suspended, either for delinquency in payment of fees or for any other reason, is not permitted to attend classes during the period of suspension.

For further regulations regarding attendance, consult the announcements of the several colleges and schools.

SCHOLARSHIP REQUIREMENTS

A student who fails to maintain the scholarship requirements of the college, school, or division in which he is registered may be dismissed from the University.

GRADES

Grades are not given out by instructors but are mailed to the student through the Office of the Registrar at the close of each term. Upon request, a copy of the student's grades will be forwarded to his parent or guardian.

The following grading system is used: excellent *A*; good, *B*; average, *C*; passing, *D*; failing, *F*. Whenever a grade has not been assigned, the symbol *Inc.* (incomplete) or the symbol *W* (authorized withdrawal) will be recorded. The symbol *Inc.* is a sign to indicate temporarily that all the required work of the course has not been completed and a satisfac-

tory explanation has been given to the instructor. An "incomplete" can not be made up after the lapse of one calendar year except by permission of the Faculty. Courses from which a student has withdrawn by proper authorization will be indicated by the symbol *W*. No student may repeat for grade a course in which he has received a grade of *D* or above, unless required to do so by the department concerned.

For graduate work, grades are indicated as "excellent", "satisfactory", "unsatisfactory", or "incomplete".

For the grading systems of the Law School and the School of Medicine, see the explanations in the announcements of those schools.

QUALITY-POINT INDEX

Quality points are computed from grades as follows: *A*, four points; *B*, three points; *C*, two points; *D*, one point; *F*, no points, for each credit hour for which the student has registered.

Scholarship is computed in terms of the quality-point index, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on the complete collegiate record. Courses marked *W* or *Inc.*, are not considered in determining the index, except that courses marked *Inc.* will be considered when a formal grade is recorded, or at the close of a calendar year, whichever occurs first. If an "incomplete" is not superseded by a proper grade within the allotted time, it is computed as zero quality points. Grades in courses taken at another institution are not considered in computing the quality-point index.

EXAMINATIONS

Examinations are scheduled in all courses at the end of each term or at the completion of the course.

For further regulations regarding examinations, consult the announcements of the several colleges, schools, and divisions.

ACADEMIC DISHONESTY

Evidence of dishonesty on the part of any student will result in his suspension from the University upon the recommendation of the appropriate dean's council.

A student found guilty of dishonesty will be deprived of credit for all courses in the term during which the dishonest act occurs.

A student may apply for readmission to the University after the expiration of not less than one calendar year from suspension. Action upon such application will be received by the dean's council. The dean's

council will recommend to the President that a student suspended twice for dishonesty will not be readmitted.

WITHDRAWAL

Withdrawal from a course or from the University, *without academic or financial penalty*, requires the permission of the dean of the college, school, or division in which the student is registered. Permission to withdraw from the University will not be granted a student who has not a clear financial record. (See "Fees and Financial Regulations", pages 24-27.)

Withdrawal between October 31 and the end of the fall term and between February 29 and the end of the spring term is permitted only in exceptional cases.

All charges for courses dropped without the approval of the dean must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

A student may not withdraw from either the basic course (2 years) or the advanced course (2 years) of the Air Force ROTC without the approval of the President of the University.

CHANGES IN PROGRAM OF STUDIES

Changes within a College, School, or Division.—A student may not change or drop courses (see "Withdrawals", above) or change his status to that of auditor except with the approval of the dean of the college, school, or division in which he is registered, upon presentation of adequate reasons for such changes.

Change from one section to another of the same course may be made with the approval of the dean and the department concerned.

Change from one major subject to another within the same college or school may be made with the approval of the dean. All requirements specified in the course of study to which the change is made must be satisfied before graduation.

Transfers within the University.—Transfer from one college, school, or division to another may be made only with the approval of the deans concerned. Except in cases of normal progression from the Junior College to Columbian College or the School of Government in a regular four-year program, application for transfer must be made to the Director of Admissions on the proper form provided by his office.

In order to provide degree candidates with proper academic counsel and the benefits of integrated programs of study, the faculties of the various schools and colleges have established minimum residence requirements and regulations with regard to supervision of the work done in the student's major field. In addition, various special regulations re-

garding course sequence, selection of electives, and advisory approval of programs apply in particular curricula. Students transferring within the University are advised to study carefully the graduation requirements on pages 48-50 and to note that in all undergraduate divisions 30 credit hours, including *at least 12 credit hours* in the major field, must be completed *in residence* in the school or college from which the degree is sought. Upon transfer the student should consult the dean concerned and understand clearly the requirements he must fulfill.

CREDIT

Credit toward a degree is given only after regular registration for and satisfactory completion of the required work of classes in the University, or upon the granting of advanced standing in accordance with the regulations of the several colleges, schools, and divisions.

On request the Registrar will issue to the student a balance sheet showing the amount of work completed and the requirements, both quantitative and qualitative, remaining to be met for the degree.

In special instances, a person who has been admitted to the University may be registered, with the permission of the instructor, as an "auditor" in a class. An auditor is not required to take active part in the exercises or to pass examinations, but no academic credit will be allowed.

TRANSCRIPTS OF RECORD

Official transcripts of student records will be forwarded on request to other institutions. Unofficial copies of records will be issued to the student on request. No charge is made for the first transcript; a fee of one dollar is charged for each one thereafter. No certificate of work done will be issued for a student who does not have a clear financial record.

SUMMER SCHOOL CREDIT

A student who plans to attend summer school sessions at another institution with the intention of having credits so obtained apply toward graduation from this University must first secure the written approval of the dean of his college or school. In no event will such credits be recognized to an amount in excess of that which might be earned in a similar period in this institution.

PHYSICAL EDUCATION REQUIREMENTS

Students in the Junior College and freshmen* and sophomores* in the School of Engineering are required to take Physical Education 1-2 and

* Freshmen in the School of Engineering enrolled in the Air Force ROTC cadet corps. Air Science 1-2 for Physical Education 1-2. Sophomores substitute Air Science 2-2 for Physical Education 1-2.

11-12 unless they are registered for less than 9 credit hours or unless regular employment during the day makes it necessary to take all classes during the evening hours.

Any other exemptions will be granted only upon written petition which has been recommended by the physical education department concerned and approved by the dean of the college or school in which the student is registered.

A student entering the University with advanced standing is not exempt from the physical education requirements unless he has satisfactorily met the requirements elsewhere. Courses in military training are not accepted in satisfaction of these requirements.

The required medical and physical examinations, as specified by the departments of physical education will be arranged at the time of registration.

GRADUATION REQUIREMENTS

To be recommended by the Faculty for graduation a student must have met the admission requirements of the college or school in which he is registered, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered, and be free from all indebtedness to the University.

Application for Graduation.—Application for a degree should be filed in the Office of the Registrar at the time of registration for the last term of the senior or final year.

Scholarship.—In all undergraduate divisions of the University the scholarship requirement for graduation is a quality-point index of at least 2.00.

The graduate student must meet the scholarship requirements for the particular degree for which he is registered.

Curriculum.—Minimum curriculum requirements for each degree are stated under the college or school offering work in preparation for the degree. (For Air Force ROTC graduation requirements see the Department of Air Science.)

Residence.—Unless otherwise specified, in all undergraduate divisions of the University, a minimum of thirty credit hours, including at least twelve credit hours in the major field, must be completed in residence in the school or college from which the degree is sought. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Summer term work may be counted in residence, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the dean of the college or school concerned to pursue work elsewhere, the work of the senior or final year must be completed in residence.

The graduate student must meet the residence requirements for the particular degree for which he is registered.

With the permission of the dean of the college or school concerned, a student may be granted leave of absence; such student should, however, remain technically in residence by paying the residence fee for each term he is absent. For the purpose of this regulation, the summer sessions will not be considered a term.

Graduate Record Examination.—All candidates for Bachelor's degrees in Columbian College, the School of Engineering, and the School of Government are required to take two parts of the Graduate Record Examination in the University's institutional testing program. The examinations are conducted by the University twice a year: the Fall Testing Session (in December) for seniors graduating in February, and the Spring Session (in April) for those graduating in June or November. Dates of the examinations are announced in the *Schedule of Classes*.

Each senior required to take the Graduate Record Examinations must register for them in the office of his dean when he registers for his final regular term of study (excluding summer sessions). A \$5 examination fee is payable at the time of registration.

Students will receive individual reports of test scores and may avail themselves of the regular transcript services of the Educational Testing Service. By special permission seniors who expect to graduate in June may take the Graduate Record Examination at the previous Fall Testing Session, so as to have transcripts available early in the year when applying for admission to graduate schools.

See the announcements of the various schools and colleges in this CATALOGUE for a description of the tests required.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

Comprehensive Problem, Thesis, or Dissertation.—A comprehensive problem, thesis, or dissertation submitted in partial satisfaction of requirements for the Master's degrees, the professional degrees in engineering, the degree of Doctor of Education, the degree of Doctor of Juridical Science, the degree of Doctor of Business Administration, or the degree of Doctor of Philosophy must be presented in its final form to the dean of the college or school concerned not later than the date specified in the University calendar. Three copies of each comprehensive problem, thesis, or dissertation are required, one typewritten original and two legible and complete carbon copies. Detailed instructions for the styling of all comprehensive problems, theses, or dissertations should be obtained from the appropriate dean.

Accepted comprehensive problems, theses, or dissertations, with ac-

companying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation. Permission to publish or adapt material in the comprehensive problem, thesis, or dissertation must be secured from the appropriate dean.

Presence at Graduation. A candidate is required to be present at the graduation exercises unless written application for graduation in absentia is approved by the dean of his college or school.

HONORS

With distinction.—In all undergraduate divisions of the University the degree may be conferred "with distinction", at the discretion of the Faculty, if a student attains a quality point index of 3.50 or higher on all work taken at this institution except that taken during the term immediately preceding the granting of the degree. To be eligible for this honor a student must have completed at this institution at least one-half of the work required for the degree.

In the School of Medicine and the Law School, degrees may be conferred "with distinction", at the discretion of the Faculty, on those students who attain an average of *A* on all work taken for the degrees.

Special honors.—Special honors may be awarded by the Faculty to any member of the graduating class for outstanding achievement in the student's major field of work on recommendation of the major department, under the following regulations:

1. The student must have his candidacy for special honors approved by the faculty member representing the major department or field not later than the beginning of the senior year.
2. The student must meet such other conditions as may be set at the time his candidacy is approved.
3. No student will be awarded special honors unless he has a quality-point index of at least 3.00 on all work taken at this institution except that taken during the term immediately preceding the granting of the degree.
4. To be eligible for honors a student must have completed at this institution at least one-half of the work required for the degree prior to the beginning of the term immediately preceding the granting of the degree.

Military honors.—An Air Force ROTC cadet may be designated a "Distinguished Air Force ROTC Student" if he (1) has completed Air Science III with an academic standing among the upper third of the students enrolled therein; (2) has an accumulative academic standing among the upper third of all students in the institution pursuing the same academic major and scheduled to graduate the same school year.

or an accumulative academic average of "B" or better; (3) possesses high moral character and definite aptitude for service in the Air Force; (4) has distinguished himself by demonstrated leadership through participation in recognized extra-curricular activities and while in attendance at Air Force ROTC summer camp. Distinguished Air Force ROTC Students are authorized to wear a "Distinguished" badge centered above the right breast pocket of the uniform.

An Air Force ROTC cadet may be designated a "Distinguished Air Force ROTC Graduate" if he has (1) been designated a Distinguished AFROTC Student and maintained the standards required of a Distinguished AFROTC Student during the period between designation and graduation; (2) completed the advanced Air Force ROTC course; (3) completed the requirements for a Bachelor's degree. Distinguished Graduates will be presented with a certificate signed by the Commandant, Air Force ROTC, and they will be given special consideration when they enter active military service and become eligible to apply for a Regular Air Force Commission.

THE LIBRARY

A student registered in the University is entitled to the reference use of the University Library. The Student Identification Card, issued upon the payment of fees, must be presented as identification.

Library books, with the exception of those in the Law and Medical collections may be drawn for home use for a period of two weeks. Any book which does circulate is subject to recall by the Librarian at any time. Reserve books and periodicals for collateral reading must be used in the reading rooms when the Library is open. With special permission they may be drawn for overnight use when the Library closes. A fine of twenty-five cents will be charged for the first hour or fraction of an hour and five cents for each hour or fraction thereafter that a reserve book is overdue. Grades of a student will be withheld until his library record is clear.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO CHANGE RULES

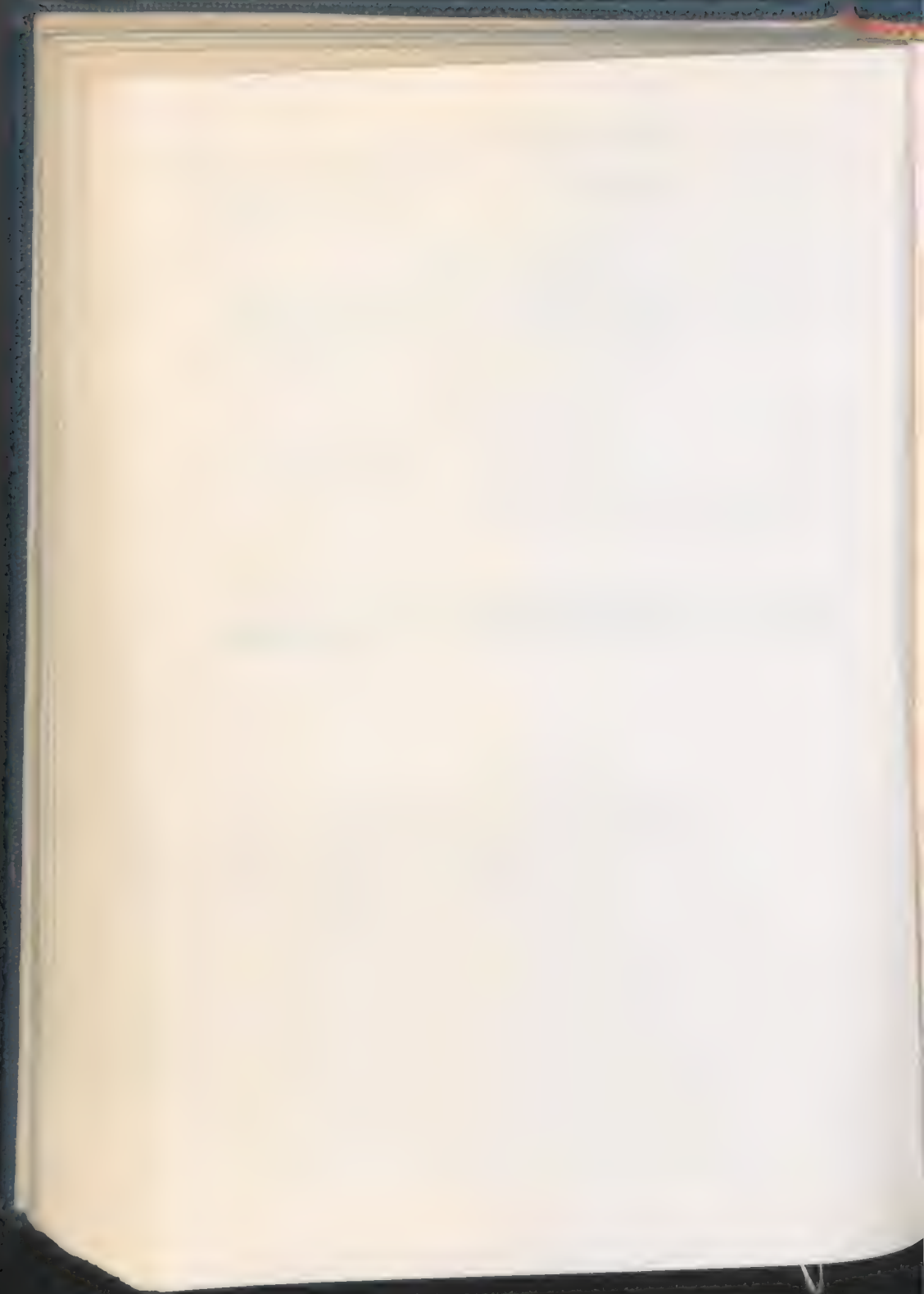
The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regu-

lations shall go into force whenever the proper authorities may determine.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" Office is maintained in the Student Union.

THE COLLEGES, SCHOOLS, AND DIVISIONS



THE JUNIOR COLLEGE

THE FACULTY AND STAFF OF INSTRUCTION •

George Martin Koehl, A.M., *Acting Dean of the Junior College*
 William Lewis Turner, Ph.D., *Assistant Dean of the Junior College*
 Carr Bartleson Lavell, A.M., *Assistant Dean in the Junior College*

Thomas Benjamin Brown, Ph.D., *Professor of Physics*
 Henry Grattan Doyle, A.M., LL.D., Litt.D., *Professor of Romance Languages*
 Norris Ingersoll Crandall, M.Arch., *Professor of Art*
 James Henry Taylor, Ph.D., *Professor of Mathematics*
 Elmer Louis Kayser, Ph.D., LL.D., *Professor of European History*
 Warren Reed West, Ph.D., *Professor of Political Science*
 Ruth Harriet Atwell, A.M., *Professor of Physical Education for Women*
 Francis Edgar Johnston, Ph.D., *Professor of Mathematics*
 Benjamin Douglass Van Evera, Ph.D., Sc.D., *Professor of Chemistry*
 Merle Irving Protzman, Ph.D., *Professor of Romance Languages*
 ‡Ralph Dale Kennedy, Ph.D., *Professor of Accounting*
 Florence Marie Mears, Ph.D., *Professor of Mathematics*
 Wood Gray, Ph.D., *Professor of American History*
 Thelma Hunt, Ph.D., M.D., *Professor of Psychology*
 Ira Bowers Hansen, Ph.D., *Professor of Zoology*
 §Paul William Bowman, Ph.D., *Professor of Biology*
 Arthur Edward Burns, Ph.D., *Professor of Economics*
 John Withrow Brewer, Ph.D., *Professor of International Law*
 Frances Kirkpatrick, A.M., *Professor of Home Economics*
 Louis Clark Keating, Ph.D., *Professor of Romance Languages*
 William Henry Myers, A.M., *Professor of Physical Education for Men*
 †Harold Loran Geisert, Ph.D., *Professor of Sociology*
 Samuel Nathaniel Wrenn, Ph.D., *Professor of Chemistry*
 Howard Maxwell Merriman, Ph.D., *Professor of American Diplomatic History*
 Ernest Sewall Shepard, A.M., *Professor of English Literature*
 Charles Watson Bliven, M.S., *Professor of Pharmacy*

* The President of the University, the Dean of Faculties of the University, the Dean and Assistant Deans of the College, the Registrar of the University, the Director of Admissions at the University, Professors, Assistant Professors, Associate Professors, Assistant Professors, and Lecturers constitute the Faculty.

† On sabbatical leave spring term, 1934-35.

‡ On sabbatical leave fall term, 1934-35.

§ On sabbatical leave, 1934-35.

Alan Thomas Deibert, A.M., *Professor of Romance Languages*
 *Myron Law Koenig, Ph.D., *Professor of American History*
 Calvin Darlington Linton, Ph.D., *Professor of English Literature*
 Charles Edward Gauss, Mus.B., Ph.D., *Elton Professor of Philosophy*
 Elbridge Colby, Ph.D., *Professor of Journalism*
 Donald Chenoweth Kline, B.Arch, M.F.A., *Professor of Art*
 Helen Bennett Lawrence, A.M., *Professor of Physical Education for*

Women

‡Charles William Cole, Ph.D., *Professor of American Literature*
 George Martin Koehl, A.M., *Professor of Physics*
 Lubin Poe Leggette, A.M., *Depew Professor of Speech*
 Robert Dale Campbell, Ph.D., *Professor of Geography*
 John Francis Latimer, Ph.D., *Professor of Classical Languages and*

Literatures

Joseph Henry Krupa, M.S., Ed.D., *Professor of Physical Education for*
Men

Roderic Hollett Davison, Ph.D., *Professor of European History*
 Calvin Weir Pettit, Ph.D., *Professor of Speech*
 Kathryn Mildred Towne, A.M., *Associate Professor of Home Eco-*
nomics

Antonio Alonso, A.M., *Associate Professor of Spanish*
 Gretchen Louisa Rogers, Ph.D., *Associate Professor of German*
 Wolfram Karl Legner, Ph.D., *Associate Professor of German*
 Elizabeth Burtner, A.M., *Associate Professor of Physical Education for*

Women

Robert Corbin Vincent, Ph.D., *Associate Professor of Chemistry*
 William Lewis Turner, Ph.D., *Associate Professor of English*
 Averett Howard, A.M., *Associate Professor of English Composition*
 Curtis Edward Tuthill, Ph.D., *Associate Professor of Psychology*
 George Francis Henigan, Jr., Ph.M., *Associate Professor of Speech*
 Robert Hamilton Moore, Ph.D., *Associate Professor of English Com-*
position

Edith Elizabeth Mortensen, Ph.D., *Associate Professor of Zoology*
 Edwin Lockwood Stevens, A.M., *Associate Professor of Speech*
 Reuben Esselstyn Wood, Ph.D., *Associate Professor of Chemistry*
 Muriel Hope McClanahan, Ph.D., *Associate Professor of English Com-*
position

Nels David Nelson, Ph.D., *Associate Professor of Mathematics*
 Sam Clark Munson, Ph.D., *Associate Professor of Biology*
 §James Harold Coberly, Ph.D., *Associate Professor of American Liter-*
ature

* On leave of absence 1933-34

‡ On sabbatical leave spring term 1934-35

§ On sabbatical leave fall term 1935-36

- Carr Bartleson Lavell, A.M., *Associate Professor of Sociology*
 William Frederick Sager, Ph.D., *Associate Professor of Chemistry*
 Raymond George Hanken, B.S. in P.E., A.M. in Ed., *Associate Professor of Physical Education for Men*
 Willard Edmund Caldwell, Ph.D., *Associate Professor of Psychology*
 Don Carlos Faith, Ph.D., *Associate Professor of Educational Psychology*
 Rafael Supervia, Doctor en Derecho, *Associate Professor of Spanish*
 James Willard Harkness, B.S., Ed.M., *Associate Professor of Chemistry*
 Mildred Hollander Shott, A.M., *Associate Professor of Secretarial Studies*
 Clifton Earl Olmstead, A.B., Th.D., *Associate Professor of Religion*
 Lewis Slack, Ph.D., *Associate Professor of Physics*
 Ronald Bettes Thompson, Ph.D., *Associate Professor of European History*
 James Coogan, Ph.D., *Associate Professor of Economics*
 Philip Highfill, Jr., Ph.D., *Associate Professor of English Literature*
 Vincent James DeAngelis, B.S. in P.E., A.M. in Ed., *Assistant Professor of Physical Education for Men*
 John Gage Allee, Jr., A.M., *Assistant Professor of English*
 Bernard Hayman Fox, Ph.D., *Assistant Professor of Psychology*
 Richard Catlin Haskett, Ph.D., *Assistant Professor of American History*
 James Willis Robb, A.M., *Assistant Professor of Romance Languages*
 Ruth Elsie Jones, A.M., *Assistant Professor of English Composition*
 Howard Roland Ludden, A.M., *Assistant Professor of Political Science*
 Theodore Peter Perros, Ph.D., *Assistant Professor of Chemistry*
 Edith Shores Surrey, A.M., *Assistant Professor of Speech*
 Robert Crompton Willson, A.B., *Assistant Professor of Journalism*
 Lee Sheward Bielski, A.M., *Assistant Professor of Speech*
 William Graham Clubb, A.M., *Assistant Professor of French*
 Walter David Fackler, A.B., *Assistant Professor of Economics*
 Helen Zhemchuzhnaya Yakobson, B.S., *Assistant Professor of Russian*
 Wilson Emerson Schmidt, Ph.D., *Assistant Professor of Economics*
 *Harland Walter Westermann, A.M., *Assistant Professor of Geography*
 Alton Harold Desmond, Ph.D., *Assistant Professor of Zoology*
 William Edward Schmidt, Ph.D., *Assistant Professor of Chemistry*
 David Gover White, B.Ch.E., Ph.D., *Assistant Professor of Chemistry*
 John Gilbert Palmer, Ph.D., *Assistant Professor of Botany*
 Richard Ernest Murphy, A.M., *Assistant Professor of Geography*
 John Palmer Reesing, Jr., Ph.D., *Assistant Professor of English*
 Edward Felix Turner, Jr., Ph.D., *Assistant Professor of Physics*
 Eva Mayne Johnson, A.M., *Assistant Professor of Psychology*
 Raymond Howard Reno, A.M., *Instructor in English Composition*
 Chester Hayden McCall, Jr., A.M., *Instructor in Statistics*
 Joseph Louis Metivier, Jr., A.B., *Instructor in Romance Languages*

* On leave of absence 1955-56.

Wilbur Earle Benson, M.B.A., *Instructor in Accounting*
 Mary Jane Cook, A.M., *Instructor in English Composition*
 Ruth Haverstock Ness, M.S., *Instructor in Chemistry*
 Roy Clay Putman, A.M., *Instructor in English Composition*

COMMITTEES*

THE DEAN'S COUNCIL‡

1956

Finest Sewall Shepard
 Howard Roland Ludden

1957

Sam Clark Munson
 James Willis Robb

1958

Richard Catlin Haskett
 Theodore Peter Perros

COMMITTEE ON ADMISSION AND ADVANCED STANDING

Carr Bartleson Lavell, *Chairman*
 Edith Elizabeth Mortensen
 Richard Catlin Haskett
 James Harold Coberly
 William Graham Clubb

COMMITTEE ON SCHOLARSHIP

William Lewis Turner, *Chairman*
 Carr Bartleson Lavell
 James Willard Harkness
 Robert Crumpton Willson
 Raymond George Hanken
 Mildred Hollander Shott
 Wilson Emerson Schmidt

JUNIOR COLLEGE ADVISORY COMMITTEE

Dean of the Junior College, *Chairman*
 Samuel Nathaniel Wrenn
 Carr Bartleson Lavell
 William Lewis Turner

GENERAL INFORMATION

INTRODUCTORY

The Junior College, which administers the first two years of the standard four-year college program in the liberal arts and sciences, was established in 1939, as a part of the academic reorganization of the University. Prior to 1939, the four-year program had been administered by Columbian College since its organization in 1821.

The Junior College curricula continue the studies of a general cultural nature begun in the secondary schools, and lay a foundation for the more specialized work which is to follow. Emphasis is accordingly laid (1) upon the social, cultural, biological, and physical background of civiliza-

* The President of the University and the Dean of the Junior College are members ex officio of all committees.
 ‡ Elected by the Faculty.

tion and (2) upon the discipline necessary to the effective prosecution of more advanced work.

The Junior College also provides the pre-professional work required for admission to the schools of Pharmacy, Education, and Government, and the first two years of the pre-professional work required by the schools of Medicine and Law.

In addition it provides two-year curricula in vocational training.

ADVISORY SYSTEM

In order that students may have opportunities for assistance in planning their courses and also for obtaining personal, educational, and vocational advice in every phase of their academic work during the first two years, a number of members of the Faculty serve as advisers to Junior College students.

Members of the Faculty, selected for their knowledge of Junior College requirements and student programs, advise students in making up their programs of study for each term. A separate staff of experienced advisers under the chairmanship of the Dean assists those students who find it difficult to make adjustments to college life because of scholastic or other reasons. Students who are "warned" or who are on probation may be required to consult these advisers at regular intervals. Students are encouraged to consult any member of the Advisory Staff or their instructors about college problems at any time.

Copies of notices of "warning" or probation will be sent to the parents or guardians of students on request, and the Dean and members of the Advisory Staff are available for consultation with parents or guardians concerning student problems.

Students in the Junior College are subject to, and are expected to familiarize themselves with, the regulations regarding ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 12-27, and the University regulations stated on pages 44-52.

SCHOLASTIC-APTITUDE TESTS

Students admitted to the Junior College may be required to take the scholastic aptitude tests of the University.

REQUIRED PLACEMENT EXAMINATIONS

English.—Special placement examinations, required of all entering freshmen, will be conducted by the English Department. Before students are registered in English 1, they are tested in the minimum essentials of vocabulary, spelling, grammar, standard usage, and writing skill. Those students who show marked superiority may, upon passing further tests,

be exempted from one or both terms of the English Composition course; those who are inadequately prepared for English 1 will be assigned to English A.

Romance Languages.—A standardized placement examination will be required of all entering students who wish to continue in college the language begun in high school. Upon completion of the examination assignment will be made to the appropriate course with credit to be assigned on the usual basis. This does not apply to students whose previous experience in a given language is equivalent to two college years.

The Use of Correct English.—The use of correct English, oral or written, is required not only in English but also in all other courses (see page 79).

FIRST- AND SECOND-GROUP COURSES

A Junior College student may not take second-group courses (courses numbered 101-200) without the written permission of the instructor and of the Dean of the Junior College. A student will not be permitted to postpone a first-group course required under the curriculum for which he is registered in order to take a second-group course for elective credit. The principle that first-group courses must be taken in the Junior College years, and advanced courses in Columbian College and the professional schools, will be rigidly adhered to in approving student programs. No student on probation is permitted to take second-group courses except by the express permission of the Committee on Scholarship.

AMOUNT OF WORK

Fifteen or sixteen credit hours, not including required physical education, constitute normal work. A student not on probation may be permitted by the Dean to take seventeen credit hours.

A student having a quality-point index of 3.50 may, with the permission of the Dean, take eighteen or nineteen credit hours. No student may take more than nineteen credit hours, except with the permission of the Committee on Scholarship.

For an employed student working more than twenty-four hours a week, nine credit hours, not including required physical education, constitute normal work. An employed student not on probation may be permitted by the Dean to take ten credit hours. An employed student having a quality-point index of 3.50 may be permitted by the Dean to take twelve or thirteen credit hours.

A student previously unemployed who accepts employment subsequent to registration or at any time during a term is required to report that fact immediately to the Dean, to bring his program within the limitations set by the Faculty for the amount of work to be carried by an employed student.

ATTENDANCE

The student is held responsible to the instructor in charge of the course for which he is registered for all the work of the course, and all absences must be excused before provision will be made for him to make up the work missed.

With the exceptions noted below, occasional absences, not to exceed in number for each term the credit hours for the term, will be automatically excused. (If a course has distinct divisions such as lectures, laboratories, recitations, etc., these excuses apply pro rata to such separate divisions.) In the application of this rule absences immediately preceding or following holiday periods are to be counted double.

Such automatic excuses are intended to cover the occasional minor exigencies and not to constitute an indiscriminate privilege. A student on probation is allowed no automatic excuses.

Excuses for absences from two or more consecutive class periods, and for absences from examinations which have been announced in advance, can be obtained only by making written application to the instructor in charge of the course.

A student whose absences from any class, whether excused or unexcused, are in excess of one-fourth of the total number of class periods will receive the grade of *F* for the course, except by special ruling of the Dean on recommendation of the instructor in the course.

CLASSIFICATION OF STUDENTS

A student who has satisfactorily completed at least thirty credit hours of work (exclusive of Physical Education 1-2 and 11-12) including eighteen credit hours in his curriculum requirements, is classed as a *sophomore*.

THE DEGREE OF ASSOCIATE IN ARTS

Upon the satisfactory completion of the requirements of the Junior College, the degree of Associate in Arts is conferred.

REQUIREMENTS FOR THE DEGREE

SCHOLARSHIP

The system of grading and of computing scholarship is described in detail on pages 44 and 45.

In order to receive the degree of Associate in Arts a student must have a quality-point index of at least 2.00.

Honor Roll.—The name of every student who has a quality-point index of 3.50 or higher will be placed on the honor roll and published. No

consideration is given to those who have completed a total of less than fifteen credit hours. A place on the honor roll does not necessarily mean that the student will receive honors upon graduation.

Probation.—A student must maintain a quality point index of at least 2.00 or be placed on probation.

A student remains on probation as long as his quality-point index is below 2.00; however, the student who has a quality-point index between 1.50 and 2.00 will be considered by the Committee on Scholarship, which may retain him on probation or suspend him.

Suspension.—A student who has a quality-point index below 1.50 will be suspended; however, a student who has a quality-point index between 1.40 and 1.50 will be considered by the Committee on Scholarship, which may retain him on probation or suspend him.

A student who is subject to probation for the third time, whether successive or after an interval, will be suspended.

A student suspended for poor scholarship may apply for readmission after an interval of one calendar year. On application for readmission the student must submit specific evidence to the Committee on Scholarship that he is better qualified to pursue college work. A student suspended twice for poor scholarship will not be readmitted.

The foregoing scholarship rules are applied when a student has undertaken a minimum of twelve hours. Thereafter, the rules are applied in multiples of nine hours.

Warnings.—At stated intervals during the academic year instructors file in the Office of the Junior College the names of those students who are doing work of D grade or lower. A "warning" will then be sent to the student and a copy of the warning filed with the appropriate adviser. A "warning" constitutes notice to the student that he must consult his instructor and adviser at the earliest opportunity. "Warning periods" are established between the 7th and 8th weeks of the fall and spring terms.

CURRICULUM REQUIREMENTS

The satisfactory completion of sixty credit hours of college work, exclusive of physical education, is required as outlined in one of the Junior College curricula described below. At least fifteen of the required credit hours must be completed in residence.

Except for students registered for the combined degrees of Bachelor of Arts and Doctor of Medicine, not more than twelve credit hours of professional courses may be included in the one hundred and twenty credit hours required for the Bachelor's degrees in Columbian College. Junior College students electing professional courses under this rule must obtain the approval of the Dean of the Junior College.

Physical Education Requirements.—Physical Education is required of

all students in the freshman and sophomore years. (See "Physical Education Requirements", pages 47-48.)

Foreign Language Requirements.—For the degree of Associate in Arts a student must have completed satisfactorily the equivalent of two years of college work in a single foreign language except in the pre-pharmacy and pre physical education curricula and the terminal curricula in secretarial studies and accounting (See "Placement Examination", pages 59-60.)

A student offering for admission four acceptable high school units of a single foreign language, or the equivalent, is not required to take any foreign language. If he offers three units, he must complete the second term of the second-year college course in the same language. If he offers two units, he must complete the entire second-year college course in the same language. If he offers one unit, he must complete the second term of the first-year college course and the entire second year course in the same language.

In some instances foreign languages are required or recommended as a preparation for advanced work in Columbian College, and the professional schools. The student should consult his adviser as to these requirements, so that appropriate foreign languages may be included, when necessary, in his Junior College program.

English Requirements.—Entering students registering in the pre-Columbian College curricula will follow the sequence of English 1, both terms or one of the introductory literature courses, and English 2. This does not apply to students transferring to these curricula or students registering in the pre-professional or vocational curricula. Students whose plans require the completion of English 1 and 2 before taking the required literature course must secure permission from the Dean.

Curricula for Admission to Columbian College and the Professional Schools

Each of the following curricula comprises the first two years of a standard four year college course and prepares the student for upper division work. Requirements for graduation from the Junior College may not be the same as the requirements for admission to Columbian College or a professional school. Therefore, the student should consult the specific admission requirements of the college or school for which he is preparing.

The first sixty credit hours of the ninety required for admission to the School of Medicine are undertaken in the Junior College. Each pre-medical program must be approved by the premedical adviser. For specific requirements, see "Admission", pages 12-22.

COLUMBIAN COLLEGE:**1. ARTS AND LETTERS***

The following two-year curriculum prepares for the Bachelor of Arts program in Columbian College:

	Credit Hours
English Composition and Literature ‡	English 1: 51-52, 71-72, 91-92, Classical Languages 71-72, French 51-52, German 51-52, or Spanish 51-52; English 4..... 12
Foreign Language	See page 63 for foreign language requirement..... 12
Social Studies	Economics 1-2, Geography 51, 52, History 4-4, 71-72, Political Science 9-10, or Sociology 1-2..... 6
Science	Biology 1-2, Botany 1, 2, Chemistry 3-4, 11-12, Physics 5, 7 (6, 7), (5, 6), or Zoology 1-2... 6-8
Physical Education	See pages 47-48 for statement of requirement.
Recommended Electives	Art 11-12, 71-72; Philosophy 51-52, 111-12; Religion 9-10, 59-60..... 6
Elective §	..... 16 or 18
Total	60 or 62

2. SCIENCE*

The following two-year curriculum prepares for the Bachelor of Science curriculum in Columbian College:

	Credit Hours
English Composition and Literature ‡	English 1: 51-52, 71-72, 91-92, Classical Languages 71-72, French 51-52, German 51-52, or Spanish 51-52; English 4..... 12
Foreign Language	French or German or non-science elective..... 12
	NOTE.—A reading knowledge of French or German is required. This may be satisfied by French 4 or German 4 or by special examination.
Mathematics	Mathematics 3, 6, or electives..... 6
	NOTE.—The Mathematics 3 requirement may be satisfied by offering two years of high school algebra acceptable for admission; the Mathematics 6 requirement may be satisfied by offer-

* Students who have had high school courses in chemistry, mathematics, and physics should consult the description of the beginning courses in these fields. For the degree of Bachelor of Science, the student should obtain the advice of the major departments as to proper prerequisite and collateral courses for the intended major.

‡ Incoming students registering in pre-Columbian College curricula will follow the sequence of English 1, both terms of one of the introductory literature courses, and English 2. This does not apply to students transferring to these curricula or students registering in the pre-professional or vocational curricula. Students whose plans require the completion of English 1 and 2 before taking the required literature course must secure permission of the Dean.

§ Credit is not given for courses elected in Physical Education or Secretarial Studies.

	ing one-half year of high school trigonometry acceptable for admission.	
Social Studies	Economics 1-2, Geography 51, 52, 71-72, History 39-41, 71-72, Political Science 9-10, or Sociology 1-2	
or Recommended Electives	Art 11-12, 71-72, Philosophy 51-52, 111-12, Religion 9-10, 59-60.	6
Science	(a) Biology 1-2, Botany 1, 2, Zoology 1-2 (b) Chemistry 11-12, Physics 5, 7 (6, 7) (5, 6)	18 to 22
	(In satisfying this requirement, at least one year-course must be taken in each group (a) and (b).)	
Physical Education	See pages 47-48 for statement of requirement.	
Elective*		2 to 12
Total		60 to 64

SCHOOL OF PHARMACY:

The following two-year curriculum prepares for the Bachelor of Science in Pharmacy curriculum in the School of Pharmacy:

	Credit Hours
English	English 1, 2
Science	Botany 1 or 2, Chemistry 11-12, Physics 5-6, Zoology 1 (Freshman year)
	Chemistry 151-52 (Sophomore year)
Social Studies	Economics 1
Professional Courses	Pharmacy 1-2 (Freshman year)
	Pharmacy 21-22, 23, 25 (Sophomore year)
Physical Education	See pages 47-48 for statement of requirement.
Elective*	
Total	69

SCHOOL OF EDUCATION:

1. EDUCATION

The following two-year curriculum prepares for the Bachelor of Arts in Education curriculum in the School of Education:

	Credit Hours
English	English 1, 2
	English 51-52, 71-72, or 91-92
Foreign Language	(French, German, Latin, Russian, or Spanish.)
	See page 63 for foreign language requirement.
	12

* Credit is not given for courses elected in Physical Education or Secretarial Studies.

† Freshmen and sophomores in the School of Pharmacy are required to take two instead of four periods of Physical Education a week for which they receive one, instead of two, credits a term.

Social Studies	History 71-72 Economics 1-2, Geography 71-72, History 39- 40, Political Science 9-10, Religion 59-60 or Statistics 1-2. (When offering for admission two or more semester senior high school units in the Social Studies may be exempted from this requirement)	6 6
Science and Mathematics	Two terms to supplement senior high school courses, selected from: Biology 1-2; Botany 1-2; Chemistry 3-4, 11-12; Physics 5 and 6 or 7; Zoology 1-2; 2 Mathematics 3 and 6 or 9 and 12	6 or 8 6
Other Courses	Psychology 1 and 22 Sociology 1 or 11 Statistics 33	3 3 3
Physical Education	See pages 47-48 for statement of requirement.	4 to 6
Elective †		60
Total		60

2. HOME ECONOMICS

The following two-year curriculum prepares for the Bachelor of Science in Home Economics curriculum in the School of Education:

Science in Home Economics Curriculum		Credit Hours
English	English 1, 2 English 31-32, 71-72; Speech 1, 2 (1, 11)	6 6
Social Studies	Learning History, Political Science, or Sociology	6
Science	Physics 1-2, Chemistry 11-12, Physics 5, 6, 7	6-8 6
Psychology	Psychology 1, 22	3
Physical Education	See pages 47-48 for statement of requirement.	4 to 6
Curriculum		
Prescriptive	Home Economics 1, 22 (1 semester, year 1) Open Elective 31, 32 (2 Semesters, year 1)	6 6
Analytic Elective ‡	Home Economics part I (Semester, year 1)	4-6
Total		60

3. PHYSICAL EDUCATION FOR MEN

The following two-year curriculum prepares for the Bachelor of Science in Physical Education curriculum in the School of Education:

* Courses selected with the recommendation of the group in the Department of Physical Education.
† Credit is not given for courses elected in required Physical Education or Secondary studies.
‡ 2 or 11.

	Credit Hours
English English 1, 2.....	6
Social Studies History 39-40, 71-72; Political Science 9-10; or Speech 1-2 (Freshman year).....	4
..... Economics, History, or Political Science (Soph- omore year).....	6
Science Biology 1-2 or Zoology 1-2 (Freshman year).....	6 or 8
Physical Education.....	8
Curriculum Requirements: Physical Education 43-44, 47; Speech 1 or 11 (Freshman year).....	9
Physical Education 45-46, 49, 52, 58; Psychology 1, 22 (Sophomore year).....	18
Elective *	7-9
Total	68

4 PHYSICAL EDUCATION FOR WOMEN

The following two-year curriculum prepares for the Bachelor of Science in Physical Education curriculum in the School of Education:

	Credit Hours
English English 1, 2.....	6
..... English 31-32, 71-72, or 31-32.....	6
Social Studies History 39-40, 71-72; Political Science 9-10; or Speech 1-2.....	6
Science Biology 1-2 or Zoology 1-2.....	6 or 8
Physical Education: See pages 47-48 for statement of requirement. Curriculum Requirements: Physical Education 43-44 (Freshman year).....	4
Physical Education 45, 50, 51-52; Psychology 1, 22 (Sophomore year).....	16
Academic Electives * (Each year).....	6 or 8
Total	60

SCHOOL OF GOVERNMENT:

1 ACCOUNTING AND BUSINESS ADMINISTRATION

The following two-year curriculum prepares for the Bachelor of Arts in Government curricula in Accounting and in Business Administration in the School of Government:

* Credit is not given for Social Studies 1 or 11.

	Credit Hours
Accounting	6
English	9
Foreign Language	12
Social Studies	6
Statistics	6
Physical Education	3
Elective*	1
Total	62

2. FOREIGN AFFAIRS

The following two year curriculum prepares for the Bachelor of Arts in Government curriculum in Foreign Affairs in the School of Government:

	Credit Hours
English	6
Foreign Language	12
Social Studies	24
Mathematics, Science, Biology, Botany, Chemistry, Mathematics, Physics, Statistics, or Zoology	6 or 8
Physical Education	6
Elective*	12
Total	60 or 62

3. BUSINESS AND ECONOMIC STATISTICS

The following two year curriculum prepares for the Bachelor of Arts in Government curriculum in Business and Economic Statistics in the School of Government:

	Credit Hours
English	6
Foreign Language	12
Social Studies	12
Mathematics	3 to 12
Accounting	6
Statistics	3 or 6
Physical Education	6 to 18
Elective*	6
Total	60

* Credit is not given for courses elected in Physical Education or Secretarial Studies.

VOCATIONAL CURRICULA

In addition to the above curricula, all of which prepare for admission to upper division colleges and schools, the Junior College offers the following two-year terminal courses.

1. SECRETARIAL STUDIES

	Credit Hours
English English 1, 2	6
..... English 51-52, 71-72, or 91-92	6
Social Studies Economics 1-2	3
General Accounting 1	3
..... Speech 11	3
Secretarial Studies* .. Secretarial Studies 1, 2, 11, 12, 15, 16, 51, and 54	24
Physical Education .. See pages 47-48 for statement of requirement.	
Elective (To be selected with approval of adviser)	12
Total	60

2. ACCOUNTING

The required work may be completed in two years on a full-time basis or in three years on a part-time basis, with the approval of the adviser.

REQUIRED COURSES

	Credit Hours
Accounting 1-2 Introductory Accounting	6
Accounting 121 Cost Accounting	3
Accounting 111 Financial Statement Analysis	3
Accounting 121-22 Intermediate Accounting	6
Accounting 161 Business Taxation	3
Accounting 171 Auditing	3
Accounting 181 Accounting Systems	3
Accounting 191 Advanced Accounting	3
Accounting 193 Business Budgeting	3
Business	
Administration 131, Business Finance	3
Economics 1-2 Principles of Economics	6
English 1, 2 English Composition	6
Political Science 127, Commercial Law: Contracts, Sales, Agency, and Bailments	3
Political Science 128, Commercial Law: Negotiable Instruments, Prop- erty, Sales, Mortgages	3
Physical Education .. See pages 47-48 for statement of requirement.	
Elective (To be selected with the approval of the ad- visor)	6
Total	60

* Qualified students, upon the approval of the adviser or the satisfactory completion of a placement test, may waive Secretarial Studies 1, 11, and 12. Other courses, approved by the adviser, will be substituted.

*Examinations for Waiving Curriculum Requirements**

A student desiring to omit a required course may take such examination as the department prescribes, and, on passing satisfactorily, he may be relieved of the curriculum requirements in that subject and may qualify for registration in an advanced course. Passing this examination does not entitle the student to any hours of credit toward the degree. A student desiring to take such examinations should make written request of the Dean and pay the required fee at the Office of the Treasurer before the date of the examination specified in the University calendar.

HONORS

The degree of Associate in Arts may be conferred "with distinction" upon the student who has a quality-point index of 3.50 or higher, provided that student has been in residence at the University for 30 hours, 15 of which must have been taken in the Junior College at the time the index is calculated.

* This provision does not apply to the premium student, all of whose required prescribed work must be taken in a residential college of arts and sciences.

COLUMBIAN COLLEGE

THE FACULTY AND STAFF OF INSTRUCTION *

Henry Grattan Doyle, A.M., LL.D., Litt.D., *Dean of Columbian College*
 Calvin Darlington Linton, Ph.D., *Assistant Dean of Columbian College*

Thomas Benjamin Brown, Ph.D., *Professor of Physics*
 Henry Grattan Doyle, A.M., LL.D., Litt.D., *Professor of Romance Languages*
 Joseph Hyram Roe, Ph.D., *Professor of Biochemistry*
 Norris Ingersoll Crandall, M.Arch., *Professor of Art*
 Robert Whitney Bolwell, Ph.D., *Professor of American Literature*
 James Henry Taylor, Ph.D., *Professor of Mathematics*
 Elmer Louis Kaver, Ph.D., LL.D., *Professor of European History*
 Errett Cyril Albritton, A.B., M.D., *Fry Professor of Physiology*
 George Gamow, Physics D., *Professor of Theoretical Physics*
 Warren Reed West, Ph.D., *Professor of Political Science*
 Frank Mark Weida, Ph.D., *Professor of Statistics*
 Francis Edgar Johnston, Ph.D., *Professor of Mathematics*
 Leland Wilbur Parr, Ph.D., *Professor of Bacteriology*
 Benjamin Douglass Van Evera, Ph.D., Sc.D., *Professor of Chemistry*
 Mitchell Dreese, Ph.D., *Professor of Educational Psychology*
 Merle Irving Protzman, Ph.D., *Professor of Romance Languages*
 Florence Marie Mears, Ph.D., *Professor of Mathematics*
 Wood Gray, Ph.D., *Professor of American History*
 Thelma Hunt, Ph.D., M.D., *Professor of Psychology*
 Ira Bowers Hansen, Ph.D., *Professor of Zoology*
 ‡ Paul William Bowman, Ph.D., *Professor of Biology*
 § Lawson Edwin Yocum, Ph.D., *Professor of Botany*
 Arthur Edward Burns, Ph.D., *Professor of Economics*
 John Withrow Brewer, Ph.D., *Professor of International Law*
 Louis Clark Keating, Ph.D., *Professor of Romance Languages*
 Paul Kenneth Smith, Ph.D., *Professor of Pharmacology*
 Harold Lorin Geisert, Ph.D., *Professor of Sociology*
 Samuel Nathaniel Wrenn, Ph.D., *Professor of Chemistry*
 Charles Rudolph Naeser, Ph.D., *Professor of Chemistry*

* The President of the University, the Dean of Faculties of the University, the Dean and the Associate Dean of the College, the Registrar of the University, the Director of Admissions of the University, Professors, Adjunct Professors, Associate Professors, and Assistant Professors constitute the Faculty.

† On sabbatical leave full term 1945-46.

‡ On leave of absence spring term 1945-46.

Howard Maxwell Merriman, Ph.D., *Professor of American Diplomatic History*

Ernest Sewell Shepard, A.M., *Professor of English Literature*

Fred Salisbury Tupper, Ph.D., *Professor of English Literature*

Alan Thomas Deibert, A.M., *Professor of Romance Languages*

Chester Elwood Leese, Ph.D., *Professor of Physiology*

Donald Stevenson Watson, Ph.D., *Professor of Economics*

*Myron Law Koenig, Ph.D., *Professor of American History*

Calvin Darlington Linton, Ph.D., *Professor of English Literature*

Angus MacIvor Griffin, Ph.D., *Professor of Bacteriology*

Charles Edward Gauss, Mus.B., Ph.D., *Elton Professor of Philosophy*

Ira Rockwood Telford, Ph.D., *Professor of Anatomy*

Elbridge Colby, Ph.D., *Professor of Journalism*

Donald Chenoweth Kline, B.Arch., M.F.A., *Professor of Art*

†Charles William Cole, Ph.D., *Professor of American Literature*

George Martin Koehl, A.M., *Professor of Physics*

Lubin Poe Leggette, A.M., *Depew Professor of Speech*

Joseph Richard Sizoo, A.M., S.T.D., D.D., Litt.D., *Milbank Professor of Religion*

Robert Dale Campbell, Ph.D., *Professor of Geography*

John Francis Latimer, Ph.D., *Professor of Classical Languages and Literatures*

Roderic Hollett Davison, Ph.D., *Professor of European History*

Calvin Weir Pettit, Ph.D., *Professor of Speech*

Wolfgang Herbert Kraus, Dr. Jur., S.J.D., *Professor of Political Science*

William Webster Deihl, Ph.D., *Adjunct Professor of Mycology*

Edward Campion Acheson, Ph.D., *Associate Professor of Finance*

Antonio Alonso, A.M., *Associate Professor of Spanish*

Gretchen Louisa Rogers, Ph.D., *Associate Professor of German*

Wolfram Karl Legner, Ph.D., *Associate Professor of German*

Robert Corbin Vincent, Ph.D., *Associate Professor of Chemistry*

Curtis Edward Tuthill, Ph.D., *Associate Professor of Psychology*

George Francis Henigan, Jr., Ph.M., *Associate Professor of Speech*

Robert Hamilton Moore, Ph.D., *Associate Professor of English Composition*

Edith Elizabeth Mortensen, Ph.D., *Associate Professor of Zoology*

Edwin Lockwood Stevens, A.M., *Associate Professor of Speech*

Reuben Esselstyn Wood, Ph.D., *Associate Professor of Chemistry*

Nels David Nelson, Ph.D., *Associate Professor of Mathematics*

Sam Clark Munson, Ph.D., *Associate Professor of Biology*

§James Harold Coberly, Ph.D., *Associate Professor of American Literature*

* On leave of absence 1955-56

† On sabbatical leave spring term 1955-56

§ On sabbatical leave fall term 1955-56

Carr Bartleson Lavell, A.M., *Associate Professor of Sociology*
 William Frederick Sager, Ph.D., *Associate Professor of Chemistry*
 James Norman Mosél, A.M., *Associate Professor of Psychology*
 Willard Edmund Caldwell, Ph.D., *Associate Professor of Psychology*
 Rafael Supervia, Doctor en Derecho, *Associate Professor of Spanish*
 William Columbus Davis, Ph.D., *Associate Professor of Latin American History*
 Clifton Earl Olmstead, A.B., Th.D., *Associate Professor of Religion*
 Lewis Slack, Ph.D., *Associate Professor of Physics*
 Ronald Bettes Thompson, Ph.D., *Associate Professor of European History*
 James Coogan, Ph.D., *Associate Professor of Economics*
 Philip Highfill, Jr., Ph.D., *Associate Professor of English Literature*
 John Gage Allee, Jr., A.M., *Assistant Professor of English*
 Bernard Hayman Fox, Ph.D., *Assistant Professor of Psychology*
 Richard Catlin Haskett, Ph.D., *Assistant Professor of American History*
 Howard Rowland Ludden, A.M., *Assistant Professor of Political Science*
 Robert Crumpton Willson, A.B., *Assistant Professor of Journalism*
 Theodore Peter Perros, Ph.D., *Assistant Professor of Chemistry*
 Walter David Fackler, A.B., *Assistant Professor of Economics*
 Helen Zhemchuzhnaya Yakobson, B.S., *Assistant Professor of Russian*
 Wilson Emerson Schmidt, Ph.D., *Assistant Professor of Economics*
 *Harland Walter Westermann, A.M., *Assistant Professor of Geography*
 Alton Harold Desmond, Ph.D., *Assistant Professor of Zoology*
 William Edward Schmidt, Ph.D., *Assistant Professor of Chemistry*
 John Gilbert Palmer, Ph.D., *Assistant Professor of Botany*
 Richard Ernest Murphy, A.M., *Assistant Professor of Geography*
 Edward Felix Turner, Jr., Ph.D., *Assistant Professor of Physics*
 Alberto Vázquez, Ph.D., *Lecturer on Spanish American Literature*

COMMITTEES‡

THE DEAN'S COUNCIL§

1956

Robert Corbin Vincent

John Gage Allee, Jr.

1957

Merle Irving Protzman
 James Harold Coberly

1958

William Edward Schmidt
 Wilson Emerson Schmidt

* On leave of absence 1955-56.

‡ The President of the University and the Dean of Columbian College are members ex officio.

§ Elected by the Faculty.

COMMITTEE ON ADMISSION AND ADVANCED STANDING

Calvin Darlington Linton, *Chairman*
 Edith Elizabeth Mortensen, *Secretary*
 Alan Thomas Deibert Charles William Cole
 James Coogan

COMMITTEE ON THE USE OF CORRECT ENGLISH

Averett Howard, *Chairman*
 George Francis Henigan, Jr. Robert Hamilton Moore
 Muriel Hope McClanahan Robert Crompton Willson

COMMITTEE ON SCHOLARSHIP

Florence Marie Mears, *Chairman*
 Samuel Nathaniel Wrenn Howard Maxwell Merriman
 Antonio Alonso John Palmer Reesing, Jr.

COMMITTEE ON STUDIES

The Dean of the College, *Chairman*
 Fred Salisbury Tupper Edith Elizabeth Mortensen
 Everett Herschel Johnson Roderic Hollett Davison

GENERAL INFORMATION

INTRODUCTORY

Columbian College was founded in 1821. James Monroe, then President of the United States, aided in obtaining the charter from Congress which established "The Columbian College in the District of Columbia" for the "sole and exclusive purpose of educating youth in the English, learned and foreign languages, the liberal arts, sciences and literature", with full power to confer all degrees "usually granted and conferred in colleges".

In 1930, when the Junior College was established, the name "Columbian College" was bestowed upon the senior college of liberal arts.

THE COLUMBIAN COLLEGE PROGRAM

Columbian College is that branch of the University which grants the Bachelor's and Master's degrees in the liberal arts. Its purpose is to enable the student to develop harmoniously both his particular abilities and his general awareness as a human being. It demands of the student a thorough acquaintance with one major area of learning and at the same time an understanding of how that field of specialization fits into the larger context of the scientific, social, and moral problems which confront modern man. It stresses not merely expertness but that broadly

enlightened expertness which encourages its graduates to grow through the years in ability and wisdom.

The program is a contemporary application of the historic liberal arts tradition. A particular vitality and meaning are imparted to it by the fact that The George Washington University is situated in the cosmopolitan capital city of a nation to which, increasingly, the world looks for leadership. Here, uniquely, the liberal arts tradition is put to the test of contact with reality.

REGULATIONS

Students in Columbian College are subject to, and are expected to familiarize themselves with, the regulations regarding ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 14-27, and the University regulations stated on pages 44-52.

PREREQUISITES

It is assumed that a student entering Columbian College has met the requirements of the Junior College under the *Arts and Letters* curriculum or the *Science* curriculum. Following is a summary of these prerequisites:

The *Arts and Letters* curriculum: (1) English composition (6 credit hours) and an additional year course (6 credit hours) in English, American, European literature, Classical, or any other foreign literature. (2) Two college years (at least 12 credit hours) of a single foreign language or the equivalent (see foreign language requirement, page 93), are required. A transfer student who has had foreign language courses in another institution meeting 4 or 5 times a week may have acquired as much as 12 credit hours in a foreign language without having taken four terms (two full years). Such a student is required to take additional work here in the same language until he has completed four terms (or an equivalent combination of high school years and college terms). (3) At least one year (6 credit hours) in social studies, chosen from first-group courses in History, Political Science, Economics, Sociology, or Geography, is required. (4) At least one year (6 or 8 credit hours) of a laboratory science (Biology, Botany, Chemistry, Physics, or Zoology) is required.

The remaining hours of the Junior College programs (roughly a minimum of 22 to 24 hours) should be devoted to the prerequisite courses required by the prospective major department (as stated following the departmental staff in the courses of instruction section of the CATALOG) or recommended by the advisers in the field-of-study major (see Pamphlets prepared by the respective advisers), together with appropriate electives.

The *Science* curriculum requirements in English are the same as those of the Arts and Letters curriculum. A year course of a social study or of a recommended elective in Art, Philosophy, or Religion is required. The foreign language requirement is the same as for the Arts and Letters curriculum, except that French or German is specified. At least 6 credit hours in Mathematics must be taken; additional work in Mathematics is required of prospective majors in Chemistry or Physics. In science, the student should take courses in both biological and physical sciences, bearing in mind the prerequisites stated by the department under which he expects to major as well as specified prerequisites in certain departments (such as Mathematics and Chemistry for majors in Physics, or Mathematics and Physics for majors in Chemistry.)

A transfer student admitted to Columbian College with deficiencies in freshman or sophomore work (whether in amount or in distribution of courses), corresponding to the programs outlined above, is required to begin to make up such deficiencies immediately upon admission to Columbian College, and to carry courses for the purpose each term until all the general education requirements described above are satisfied. Students transferring from the School of Government must complete pre-Columbian College requirements in science and in literature as prescribed in the Arts and Letters curriculum.

AMOUNT OF WORK

A full-time student who is not on probation may take ordinarily not more than seventeen credit hours. A student employed more than twenty-four hours a week, who is not on probation, may take not more than ten credit hours.

A full time student whose quality-point index is 3.50 or higher may take not more than nineteen credit hours. An employed student who meets the same standard may take not more than twelve credit hours.

A student previously unemployed who accepts employment subsequent to registration or at any time during a term is required to report that fact immediately to the Dean, in order that adjustments in schedule may be made, if necessary, to bring his program within the Faculty's limitations upon the amount of work to be carried by an employed student.

ATTENDANCE

The student is held responsible for all the work of the courses in which he is registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up the work missed. Excessive absence in any course will lead to loss of credit in

that course, even though other requirements, such as tests, term-papers, and examinations, are met.

CLASSIFICATION OF STUDENTS

A student who has completed less than thirty credit hours in Columbian College, and who has registered his major at the Office of the Registrar is classed as a *junior*. A student who has completed thirty credit hours in Columbian College, including at least one course in his major, is classed as a *senior*. A student who has satisfactorily completed the work for the Bachelor's degree, and whose program of study has been approved and filed in the Office of the Registrar, is classed as a *master in course*.

INDEPENDENT STUDY PLAN

Under the independent study plan a student of demonstrated capacity, with special interest in the subject matter of a course, may be permitted to undertake independent study under the personal direction of an instructor, in accordance with the rules of the division in which the subject falls. Credit under this plan is limited to the specific course credits as designated in the list of courses of instruction in the CATALOGUE.

CORRESPONDENCE AND HOME-STUDY COURSES

No credit is given for work done by correspondence or in home-study courses.

THE BACHELOR'S DEGREES

Upon the satisfactory completion of the undergraduate requirements of Columbian College, the degree of Bachelor of Arts or Bachelor of Science is conferred.

In cooperation with the School of Medicine a seven-year curriculum leading to the combined degrees of Bachelor of Arts and Doctor of Medicine is offered.

REQUIREMENTS FOR THE DEGREES

RESIDENCE

For the residence requirement, see page 48. Students intending to transfer to Columbian College from a non degree-granting division of the University should note specifically the regulation concerning transfer within the University, see pages 46-47.

SCHOLARSHIP

The system of grading and of computing scholarship is described in detail on pages 44 and 45.

In order to graduate, a student must have a general quality-point index of at least 2.00. In addition, the student with a Departmental Major must have a quality-point index of at least 2.50 in his major subject. Grades in courses taken at other institutions are not considered in computing the quality-point index. The student with a Field-of-Study Major meets the qualitative requirement by passing the Major Examination.

In computing the quality point index in the major, all second group and third group courses in the major field taken at The George Washington University are included, even though minimum requirements for the major may have been exceeded, except when registration for graduate credit is approved. Grades received in first group courses are not considered.

Probation.—A student must maintain a quality-point index of at least 2.00, or be placed on probation. A student remains on probation as long as his quality-point index is below 2.00, or until his probation is removed by the Committee on Scholarship.

Suspension.—A student who has a quality-point index below 1.50 or who is placed on probation for a third term, whether successive or after an interval, is suspended.

A student suspended for poor scholarship may apply for readmission after an interval of one calendar year. He must then submit evidence to the Committee on Admission and Advanced Standing that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student suspended twice for poor scholarship will not be readmitted.

The foregoing scholarship rules are applied to a student with a limited schedule only when he has undertaken a minimum of fifteen credit hours.

CURRICULUM REQUIREMENTS

The curriculum requirements for the Bachelor's degrees include at least sixty credit hours beyond the requirements of the Junior College (the curriculum in *Arts and Letters* or in *Science*) and the satisfactory completion of the major. Each program must be approved by the major adviser and by the Dean.

At least twenty-four credit hours of the last sixty credit hours counted towards the Bachelor's degree must be taken in subjects* not included in the major field or department. The student should consult his major adviser at each registration regarding the inclusion in his program of suitably distributed electives.

Except for students registered for the combined degrees of Bachelor

* Art, History, Biology, Chemistry, English, Economics, Education, Foreign Languages, French, German, Italian, Latin, Mathematics, Modern Languages, Music, Philosophy, Physics, Political Science, Psychology, Sociology, Spanish, Statistics, Zoology.

of Arts and Doctor of Medicine, not more than twelve credit hours of professional courses may be included in the one hundred and twenty credit hours required for the Bachelor's degrees in Columbian College. Columbian College students electing professional courses under this rule must obtain the approval, in advance, of the Dean of Columbian College. Ordinarily courses in Physical Education and technical courses in Education will not be approved for credit toward a degree in Columbian College.

After selecting a curriculum, a student may not change to another except by permission of the Dean and on condition that he fulfill the requirements of the curriculum to which he changes which are in effect at the time the change is approved by the Dean.

Each student is required to select and file with the Registrar a choice of major upon entering Columbian College. He may change the major only with the consent of the Dean and of the department or division concerned, and must meet the requirements for the new major which are in effect at the time the change is approved by the Dean.

First-group courses may be required as prerequisites to undergraduate-major programs, but because of their introductory character may not be counted as part of such programs. (See "Explanation of Course Numbers".)

Students transferring from other institutions or from other schools, colleges, or divisions in this University with major requirements wholly or substantially met will, nevertheless, be required to complete satisfactorily at least twelve credit hours of approved work in the major field in Columbian College in order to receive a Bachelor's degree. This work will count as part of the minimum residence requirement.

Examinations for Waiving Curriculum Requirements.—A student desiring to omit a required or prerequisite course may take such examination as the department prescribes, and, on passing satisfactorily, he may be relieved of the curriculum or prerequisite requirement in that subject and may qualify for registration in an advanced course. Passing of this examination shall not entitle him to any credit toward a degree. A student desiring to take such examinations should make written request of the Dean and pay the required fee at the Office of the Treasurer before the date of the examination specified in the University calendar.

Use of Correct English.—Any student whose English in any course whatever is deemed unsatisfactory may be reported by the instructor to the Dean and to the Committee on the Use of Correct English. The Chairman of the Committee may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed by failure to make up

any such deficiency in English to the satisfaction of the Committee and the Dean.

GRADUATE RECORD EXAMINATIONS

During the final term of the senior year students in Columbian College are required to take the following Graduate Record Examinations: the Aptitude Test, which provides a measure of general scholastic ability at the graduate level; and Area Tests (achievement), which measure breadth of knowledge and understanding in three broad areas of the liberal arts: Natural Science, Social Science, and the Humanities. (For further information concerning the Graduate Record Examinations, see page 49.)

Bachelor of Arts

The work of the junior and senior years, including a major in one of the following major fields, must be approved by the major adviser and by the Dean.

Major Fields.—American Thought and Civilization, Art (Appreciation or Drawing and Painting), Biology, Botany, Chemistry, Economics, English Literature, French Literature, Geography, Geology, Germanic Languages and Literatures, History, Journalism (News-Editorial or Public Relations), Latin American Civilization, Mathematics, Philosophy, Physics, Political Science, Psychology, Religion, Sociology, Spanish American Literature, Spanish Literature, Speech, Statistics, Zoology.

Combined Degrees of Bachelor of Arts and Doctor of Medicine.—A candidate for the combined degrees of Bachelor of Arts and Doctor of Medicine must: (1) complete the Medical School entrance requirements (see pages 15-16); (2) fulfill the Junior College Arts and Letters requirements (see page 64); (3) fulfill the Columbian College residence requirement of at least thirty credit hours; (4) obtain the approval of the Dean of Columbian College at the time of entering the School of Medicine; (5) obtain the recommendation of the Dean of the School of Medicine at the completion of all prescribed courses in the first year of the School of Medicine, at which time the degree of Bachelor of Arts will be conferred (professional work taken at another institution will not satisfy the major requirement for the combined degrees); (6) maintain throughout the entire course the scholarship level required for graduation.

Bachelor of Science

The work of the junior and senior years, including a major in one of the following sciences must be approved by the major department or division and by the Dean.

Biological Sciences

Biology
Botany
Zoology

Physical Sciences

Chemistry
Mathematics
Physics
Statistics

THE UNDERGRADUATE MAJOR*

There are two types of undergraduate majors: the field-of-study major and the departmental major.

THE FIELD-OF-STUDY MAJOR

Each Field-of-Study Major covers a carefully worked out field of co-ordinated study and is under the supervision of the division or divisions concerned.

The *Field-of-Study Major* requires no specific number of credit hours, no specific program of courses, and no specific quality-point index for the major, although the student is required to meet the over-all general requirements for the degree (at least 120 credit hours, plus required physical education, with a quality-point index of at least 2.00). The Major Examination in the Field-of-Study Major replaces all of the traditional quantitative and qualitative requirements for a major. Ability to pass the Major Examination is assumed to be a convincing demonstration that the student possesses the breadth, depth, and quality of knowledge of his major usually defined in terms of credit hours, courses, grades, and a better than-average quality-point index. A pamphlet prepared under the direction of the adviser in the field of study and obtainable either from the adviser or from the Office of the Dean of Columbian College provides the information needed by the prospective student, who should place himself under the direction of the appropriate adviser immediately upon completing Junior College work and beginning his junior year (the first senior-college year) in Columbian College.

The Field-of-Study Major places special emphasis on the intellectual development of the individual student. Programs in the same major may vary, depending upon the individual student's background, previous study, reading habits, and aptitudes. The student is expected to consult his adviser frequently, and the special proseminar offered in the field gives him further opportunity for individual advice and direction in pursuing a program especially adapted to his needs and abilities. A close student-adviser relationship is essential for the student's success under the Field-of-Study Major plan.

* For a complete description of the undergraduate major, see the special bulletin.

The following Field-of-Study Majors are offered: (1) American Thought and Civilization, (2) Biology, (3) English Literature, (4) French Literature, (5) History, (6) Latin American Civilization, (7) Philosophy, (8) Spanish American Literature, (9) Spanish Literature, (10) Statistics, (11) Zoology.

The major in Biology extends broadly over the work of its division and those in American Thought and Civilization and in Latin American Civilization involve studies in two divisions, those of Languages and Literatures and of Social Sciences. The other Field-of-Study Majors, with the exception of the major in Spanish American Literature, replace departmental majors in their respective fields. A candidate for a Bachelor's degree with a major in Biology, English Literature, French Literature, History, Philosophy, Spanish American Literature, Spanish Literature, Statistics, or Zoology must elect a Field-of-Study Major.

Proseminar in the Major

For the convenience of the student a proseminar is offered in each field of study, under the supervision of the division in which the major is taken. This course, planned and administered by the professor or adviser of the major subject, will advise, guide, and instruct the student in his reading, study, and laboratory exercises in order to assist him in gaining a coordinated knowledge of his field. It is a presentation of the content and methods of the major field as a whole through the organization and coordination of the knowledge obtained in the various formal courses in the major subject and of material not usually included in such courses. This course is not required. Six credit hours, but no qualitative grade, may be assigned. When registered in this course, the student will have the privilege of visiting subject to the approval of the instructor, any other appropriate course offered in the College. (Regular attendance in a course, either for credit or as an auditor, requires registration and payment of tuition.) Proseminars are open only to the student who has been accepted as a candidate under that specific major.

THE MAJOR EXAMINATION

The Major Examination will normally be taken by the student at the close of the senior year; in the case of a student on a limited schedule the Major Examination may be taken not earlier than one calendar year before graduation. A student who fails to pass a Major Examination may, at the discretion of the Columbian College Committee on Studies, be reexamined at a later regular major examination period. The educational committees of the respective divisions will have general supervision of the preparation, reading, and grading of Major Examinations. Major Examinations will be held in each regular term on dates fixed by

the respective educational committees, but in no case later than January 15 for the fall term, May 15 for the spring term, and August 7 for the summer term.

DEPARTMENTAL MAJORS

Departmental Majors, unlike *Field-of-Study Majors*, are specifically defined in terms of credit hours, required courses, and the attainment of a quality-point index of at least 2.50 in all second-group courses taken in the major field. The minimum specific requirements for Departmental Majors are listed below the staff of instruction of the department concerned in the section of the CATALOGUE devoted to courses of instruction. The Executive Officer of the Department, or his representative at registration, should be consulted concerning the student's program of courses, and the entire program, including electives, must be approved by the Department. The student is also expected to consult the Executive Officer or adviser in all matters affecting his program of studies, such as changes, substitutions, or withdrawals, and especially concerning his progress in his courses. As far as possible the close student-adviser relationship developed in the *Field-of-Study Major* will be cultivated also in *Departmental Majors*.

Until further notice Departmental Majors will be offered in the following: Art (Appreciation, Drawing and Painting), Botany, Chemistry, Economics, Geography, Geology, Germanic Languages and Literatures, Journalism (News-Editorial or Public Relations), Mathematics, Physics, Political Science, Psychology, Religion, Sociology, and Speech.

THE MASTER'S DEGREES

Upon the satisfactory completion of the graduate requirements of Columbian College, the degree of Master of Arts or Master of Science is conferred.

DEFINITION OF THE MASTER'S WORK

The study leading to the degree of Master of Arts or Master of Science is a comprehensive survey of a field of knowledge. It is a continuation of the work of the student's undergraduate major and involves a greater acquaintance with scholarly method.

The student must satisfy certain minimum requirements as to previous preparation, residence, ability to read an approved modern foreign (European) language, and courses taken; but these requirements, while essential, are regarded primarily as qualifying measures. The student's knowledge of his field, as demonstrated by his thesis and by the results of his Master's Examination (together with such other examination in-

volving special skills or techniques as the department or division may require), is the basis upon which the Master's degree is conferred.

MASTER OF ARTS

Graduate work leading to the degree of Master of Arts is offered in the following fields:

American Literary and Cultural History, Bacteriology, Biochemistry, Biology, Botany, Chemistry, Chemotherapy, Economics, English and American Literature, English Literature, French Literature, Geography, Geology, Germanic Languages and Literatures, History, Latin American Civilization, Mathematics, Pharmacology, Philosophy, Physics, Physiology, Political Science, Psychology, Sociology, Spanish American Literature, Spanish Literature, Statistics, Zoology.

Special programs involving coordinated work in two or more departments may be arranged with the approval of the appropriate division or divisions.

MASTER OF SCIENCE

Graduate work leading to the degree of Master of Science is offered in the following fields:

Anatomy, Bacteriology, Biochemistry, Biology, Botany, Chemistry, Chemotherapy, Mathematics, Pharmacology, Physics, Physiology, Psychology, Statistics, Zoology.

Special programs involving coordinated work in two or more departments may be arranged with the approval of the appropriate division or divisions.

REQUIREMENTS FOR THE DEGREES

RESIDENCE

An academic year of residence in Columbian College is required, i.e., completion of a minimum of thirty credit hours of work including the thesis, which is counted as the equivalent of six credit hours of course work. Summer term work may be counted in residence, but in no case may the period of residence aggregate less than twenty seven weeks. Not more than twelve credit hours (which must be approved in advance by the Dean of Columbian College) may be taken in another school or division of this University, and such work may not be counted toward both a degree in that school or division and the Master's degree in Columbian College. No part of the minimum requirement may be taken elsewhere. All work for the degree of Master of Arts or Master of Science must be completed within a maximum of three years, unless the Dean's Council considers the circumstances so unusual as to justify an extension of time.

SCHOLARSHIP

A Master's candidate must attain the grade of "Ex." (excellent) in at least six credit hours of the course requirements for the degree in order to receive the Master's degree.

A student whose scholarship is unsatisfactory may be suspended by the Dean upon recommendation of the Division under which the student is working. A Master's candidate who accumulates nine credit hours or more of "Unsat." (including grades of "C" or lower in prerequisite courses) will be automatically suspended. Regarding the system of grading, see pages 44 and 45.

PROGRAM OF STUDIES

The student's program of studies must be outlined in detail at the beginning of his work, in triplicate, on forms available at the Office of the Dean. Each program is subject to the approval of the department and the division. The program may be revised as the occasion requires, but any change necessitates a repetition of the procedures just described.

The candidate for the Master's degree ordinarily may specialize exclusively in the field of his choice. Any student, however, whose undergraduate training does not include at least one full year of work in each of the following areas of study: (1) mathematics or science (with or without laboratory), (2) social science, and (3) the humanities (literature, philosophy, art, music, or religion), must make up this deficiency in his general education before being admitted to candidacy for Master of Arts degree. This last provision does not apply to candidates for the Master of Science degree.

Courses numbered from 1 to 100 may not be credited toward the Master's degrees, but may in certain instances be required as a basis for advanced work. At least six credit hours of the course work required for the Master's degree must be taken in courses numbered over 200. Courses numbered over 100 may be credited toward the degree, provided the completion of additional work has been certified by the appropriate officer of instruction. (See "Explanation of Course Numbers.")

A student who expects to continue his studies for the degree of Doctor of Philosophy after receiving the Master's degree is strongly advised so to plan his program from the beginning that work for the lower degree may help to prepare him for the higher.

FOREIGN LANGUAGE REQUIREMENT

Before being admitted to candidacy the student must show that he has a reading knowledge (certified by the appropriate foreign-language department) of at least one modern foreign (European) language, se-

lected by the division under which he is studying. A student whose field is a modern foreign language or literature may not offer that language in satisfaction of the reading-knowledge requirement. Any Master's candidate who chooses to meet the Master's language requirement in French or German and has not passed the French or German foreign language examination by the end of fifteen attempted credit hours must register for French 49 or German 49 as part of his next registration. In the case of Spanish no similar course is available at present. The Master's reading examinations in French and Spanish will be given at the first class meeting of French 49, in German at the first meeting of German 49, and again at the end of the courses. These examinations are open to all Master's candidates, whether enrolled in the courses or not; however, a candidate not enrolled who expects to present himself for any of the regularly scheduled examinations should notify the Dean at least a week in advance. Those enrolled in French 49 or German 49 who pass the first examination are excused from the course and will receive a refund of tuition. Students who expect to take a reading examination in any approved language other than French, Spanish, or German should notify the Dean at the time of registration.

ADMISSION TO CANDIDACY

A student must be admitted to candidacy before he begins the last half of his work for the Master's degree. Application for admission to candidacy is made on a form obtained at the Office of the Dean, and must be approved by the appropriate representative of the department or division and by the Dean. If a prospective candidate, in his previous academic work, has not substantially satisfied the prerequisites for the Master's degree, including the undergraduate major as defined by the appropriate department or division, he will not be admitted to candidacy until such deficiency has been made up. He may make up his deficiencies by electing appropriate courses in addition to those counted toward his degree.

THE MASTER'S THESIS

The thesis may be of a research, expository, critical, or creative type. The main purpose of a Master's thesis is to demonstrate the student's ability to make independent use of the information and training acquired through his other disciplines, and to furnish objective evidence of his constructive powers in his chosen field. Registration for the thesis must be no later than the beginning of the final year of preparation, unless the professor in charge of the thesis permits registration at the beginning of the final term. The choice of the thesis subject must be approved by the professor in charge of the student's field and recorded in the Office of the Registrar by the date announced in the University calendar. Regis-

tration for the thesis is ordinarily made on the basis of three credit hours a term for two successive terms. In exceptional cases, and with the approval of the professor in charge of the thesis, the student may register for the entire six credit hours during a single term. The typewritten thesis in its final form must be submitted by the student for the approval of the professor in charge of the student's field and of the educational committee of the division concerned, not later than the date announced in the University calendar. Requirements regarding the form of the thesis are stated on page 49, and additional information will be supplied by the Dean.

Payment of tuition for the thesis entitles the candidate, during the academic year of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished an additional successive academic year may be granted without further tuition payment. If the preparation of the thesis extends beyond the two-year period the student must register for it again, and pay tuition on the same basis as for a repeated course.

THE MASTER'S EXAMINATION

In addition to such other examinations as may be required, the candidate must pass a general written examination on the major subject. Examinations will be held on dates fixed by the respective educational committees, but in no case later than January 15 for the fall term, May 15 for the spring term, and August 7 for the summer term. The provisions of the field-of-study plan for undergraduate majors which concern the general examination for the major also apply to the Master's Examination. A candidate who fails to pass the Master's Examination may, in exceptional circumstances and with the specific approval of the division concerned, repeat the examination, but only after the lapse of one term. If he fails a second time, no further opportunity to take the examination will be permitted.

THE GRADUATE COUNCIL

Robert Whitney Bolwell, Ph.D., *Chairman of the Graduate Council*

MEMBERS OF THE COUNCIL*

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 Ira Bowers Hansen, Ph.D., *Professor of Zoology*
 §Paul William Bowman, Ph.D., *Professor of Biology*
 ¶Lawson Edwin Yocum, Ph.D., *Professor of Botany*
 Arthur Edward Burns, Ph.D., *Professor of Economics*
 John Withrow Brewer, Ph.D., *Professor of International Law*
 Louis Clark Keating, Ph.D., *Professor of Romance Languages*
 Paul Kenneth Smith, Ph.D., *Professor of Pharmacology*
 Samuel Nathaniel Wrenn, Ph.D., *Professor of Chemistry*
 Charles Rudolph Naeser, Ph.D., *Professor of Chemistry*
 Howard Maxwell Merriman, Ph.D., *Professor of American Diplomatic History*

* The President of the University, the Dean of Faculties of the University, and the Registrar of the University are members of the Council.
 † The additional term ending term 1935-36.
 ‡ The additional term fall term 1935-36.
 § The term of absence spring term 1935-36.

Fred Salisbury Tupper, Ph.D., *Professor of English Literature*
 Chester Elwood Leese, Ph.D., *Professor of Physiology*
 Donald Stevenson Watson, Ph.D., *Professor of Economics*
 Angus MacIvor Griffin, Ph.D., *Professor of Bacteriology*
 Carleton Raymond Treadwell, Ph.D., *Professor of Biochemistry*
 Ira Rockwood Telford, Ph.D., *Professor of Anatomy*
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 Ronald Bettes Thompson, Ph.D., *Associate Professor of European History*
 Bernard Hayman Fox, Ph.D., *Assistant Professor of Psychology*

CONSULTANTS IN RESEARCH

Samuel Jacob Ajl, Ph.D., *Chief Microbiological Chemistry Section, Department of Bacteriology, Army Medical Service Graduate School, Walter Reed Army Medical Center; Bacterial Physiology and Nutrition*
 Joseph William Ballantine, A.B., LL.D., *Consultant, Broadway Institution; The Fat Fast*
 Zoltan Bay, Ph.D., *Research Professor of Physics, The George Washington University; Electronics*
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- Leonard Peter Schultz, Ph.D., *Curator of Fishes, United States National Museum; Vertebrate Zoology; Ichthyology*
- Lyman Bradford Smith, Ph.D., *Associate Curator, Division of Phanerogams, Department of Botany, Smithsonian Institution; Taxonomy*
- Alberto Vázquez, Ph.D., *Foreign Affairs Specialist, Division of Research for American Republics, Office of Intelligence Research, United States Department of State; Latin American Literature*
- Erwin Paul Vollmer, Ph.D., *Research Physiologist, Naval Medical Research Institute; Endocrinology*
- Henry Welch, Ph.D., *Director, Division of Antibiotics, Food and Drug Administration, Department of Health, Education, and Welfare, Antibiotics*

Willard Hull Wright, D.V.M., Ph.D., *Scientist Director, United States Public Health Service; Chief, Laboratory of Tropical Diseases, National Microbiological Institute; Parasitology*

Ralph Aubrey Young, M.B.A., Ph.D., *Director, Division of Research and Statistics, Board of Governors, Federal Reserve System; International Finance*

GENERAL INFORMATION

INTRODUCTORY

The Graduate Council offers a program of advanced study and research leading only to the degree of Doctor of Philosophy. It was established in 1930 to replace the Graduate School which had formerly administered work for the Master's as well as the Doctor's degrees. The Graduate Council provides a doctoral discipline which moves freely across administrative lines dividing departments of instruction or fields of study. It gives personal supervision to a limited number of students, each of whom has his own consultative committee, examinations, and research direction.

FIELDS OF RESEARCH

The following fields of research have been authorized by the Graduate Council as those in which doctoral investigations and dissertations may be undertaken. The supporting fields of study required of all candidates for the degree of Doctor of Philosophy are specified for each individual student by his Consultative Committee before admission to study under the Council.

This list of fields is subject to such changes as the educational resources of the University may direct. The prospective student may address preliminary inquiries concerning his research interests to the member of the Council who is in charge of the field, or to the Chairman of the Graduate Council.

Anatomy

(1) Gross Anatomy, (2) Histology
Histology

Tolson
McCarré

Bacteriology

Asiatics
Bacterial Physiology and Nutrition

Wells
All

(1) Immunity in Tuberculosis, (2) Coliform Bacteria and Antitoxins

Patt

(1) Intestinal Microbiology, (2) Immunology, Auto-genic Alleviation

Guthrie
Robinson

Virology

Biochemistry

Animal Nutrition
 Biochemical Detoxication
 (1) Carbohydrate Metabolism; (2) Nutrition (emphasis on
 vitamins); (3) Pathological Chemistry
 Lipids
 Tissue Respiration

Briggs
 Brodie
 Roe
 Treadwell
 Burk

Biology

Cytology

Bowman

Botany

(1) Mycology; (2) Plant Pathology
 Plant Physiology
 Plant Physiology
 Taxonomy

Diehl
 Yocum
 Borthwick
 Smith

Chemistry

Inorganic
 Organic
 Physical Kinetics and Electrochemistry
 Physical Spectroscopy
 Physical-Organic Reaction Mechanisms

Naeser
 Wrenn
 Wood
 Van Evera
 Sweet

Economics

(1) Economic Fluctuations; (2) History of Economic Thought
 (1) Economic Theory; (2) Economic Planning
 International Economics
 International Finance
 (1) National Income; (2) Public Finance
 Trade Relations

Barris
 W. Ryan
 Polak
 Young
 Cohen
 Kennedy

History

Europe: (1) Diplomatic since 1815; (2) The Modern Near East
 European Nationalism
 European Roman and Soviet
 Latin American History
 United States: (1) Diplomacy; (2) Political
 United States: (1) Social; (2) Economic

Devlin
 Kayser
 Thompson
 Davis
 Morrison
 Gray

Law

Jurisprudence

Cutler

Literatures and Languages

American: Literary Nationalism
 English: (1) Sixteenth Century Drama; (2) Seventeenth Century
 Drama
 Romance: Latin American Literature

Balwell
 Tappan
 V. ...

Romance: Modern Spanish Literature	Alonso
Romance: (1) Romance Linguistics; (2) Old and Middle French; (3) Old Spanish	Doyle
Romance: Seventeenth Century Literature	Protzman
Romance: (1) Sixteenth Century French Literature; (2) Modern French Literature	Keating

Mathematics

Algebra: Finite Groups	Johnston
Analysis: Infinite Series	Mears
Geometry: Differential Geometry	Taylor

Pharmacology

(1) Chemotherapy; (2) Drug Metabolism	Smith
(1) Drug Metabolism; (2) Medicinal Chemistry	Mannick

Physics

Electron Optics	Marton
Experimental: Electronics	Brown
Experimental: Electronics	Bay
Low Temperature Studies	Pellam
Theoretical: Aerodynamics	Frankel
Theoretical: (1) Relativity; (2) Nuclear; (3) Astrophysics	Gamow
Theoretical: The Solid State	Munster

Physiology

(1) Blood Pressure Studies; (2) Neuro-Muscular Studies	Loose
Cardio-vascular Shock	Rosenhan
Endocrinology	Villaverde
Hematology	Combs
(1) Nutrition and Endocrines; (2) Cardio-vascular System	Atkinson

Political Science

International: Comparative Government and Political Theory	Kramer
International: International Politics and Organization	Hughes
International: The Far East	Balch
International Law; (1) War and Neutrality; (2) Arbitration	Brewer
United States: (1) The Legislative Process; (2) Governmental Organization and Administration	West

Psychiatry

Problems of Treatment (M.D. degree required for admission)	Overholser
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Psychology

Counseling and Guidance	Dreese
Experimental Psychology	Fox
Military Counseling and Guidance	Firth
Personnel Psychology	Mandel
(1) Psychological Measurements; (2) Abnormal Psychology	Hunt
Social Psychology	Turk

Statistics

Multivariate Analysis

(1) Theoretical: Probability and Sampling; (2) Applied: Econometrics

Kullback
Weida*Zoology*

Entomology: Insect Physiology

Invertebrate: Crustacea

Invertebrate: Molluscan Morphology and Physiology

Parasitology: Parasitic Protozoa

Vertebrate: Embryology and Morphogenesis

Vertebrate: Ichthyology

Munson
Schmitt
Galsoff
Wright
Hanson
Schutz

ADMISSION PROCEDURE

For admission the student must possess adequate preparation for advanced study, including satisfactory Bachelor's and Master's degrees, or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship. Previous graduate study should have been in the same general field as that proposed for doctoral study.

Before applying, the student should have personal interviews with the Chairman of the Council and the professor in charge of the central field of study.

After application blank and transcripts of previous academic training have been filed the student must demonstrate his ability to read either French or German in the field of his major interest. Both French and German are required without exception, but only one at the time of admission. The student then meets his personal admission committee which makes its recommendations to the Council. The committee may specify additional prerequisites for the student's doctoral program.

STUDY FOR THE COUNCIL FELLOWSHIP EXAMINATION

The discipline for the degree is divided into two stages. The first is made up of study in related fields of learning which support the general area of research concentration, culminating in the Council Fellowship Examination. The second stage is composed of research and investigation of a particular project in a special field and the presentation of such research in a written dissertation, culminating in the Final Examination.

At the beginning of the student's program of study leading to the Council Fellowship Examination, a consultative committee is assigned to direct his work in a group of fields of learning, usually five or six in number, deemed necessary to insure his breadth of knowledge and general competence for continuing independent research, as well as to support the dissertation project in his central field. Members of the consultative committee will advise the student concerning the scope and

content of these supporting fields, and will assist the student in preparation for his examination in them.

This advanced study may be done by attending graduate courses or instruction and seminars, by conference with members of the student's committee, and by independent means. The examination, however, not credits or grades for work done in courses, is the sole test of the student's ability to enter upon the second phase of his doctoral discipline. The examination is a series of written tests usually extending over a period of one week. The major portion of a day is given to each part of the examination covering one of the fields of study on the student's program. If the results of the examination are satisfactory the student is admitted as a Fellow of the Graduate Council, to pursue his specialized study and research under the supervision of a member of the Council.

RESEARCH, THE DISSERTATION, AND THE FINAL EXAMINATION

After the student has been inducted as a Fellow of the Council and his research program has been arranged, he is responsible only to the member of the Council who directs his research project. As a Fellow, he may attend general meetings of the Council and participate in the programs of research discussion, and enjoy unrestricted use of all the academic facilities of the University. When necessary, the Graduate Council makes provision for sending the Fellow to some other institution, library, or laboratory for special study in connection with his doctoral investigation.

The doctoral dissertation is required of all Fellows as evidence of ability to perform scholarly research and to interpret its results. An extended summary of the dissertation is published in a periodical volume by the University for distribution to other institutions and libraries. Printed copies of detailed regulations concerning the dissertation are supplied to all candidates for the doctorate.

When the completed dissertation has been approved by the member of the Council in charge of the research project, the Fellow is presented for his final examination. This examination is oral and open to the public. The committee of examiners includes not only members of the Council competent in the research field or in closely related subjects, but also at least two qualified experts from other research institutions brought to the University to participate in the examination. If the Fellow satisfies the examining committee concerning the high quality and originality of his contribution to knowledge as well as his mastery of the scholarship and research techniques of his field, the Council recommends him for the degree of Doctor of Philosophy.

POST-DOCTORAL STUDY

The Council expects its graduates to continue their interest in advanced study and research, and to contribute to its program. All graduates are listed as Associate Fellows and, upon request, will receive notices of all general meetings. They may continue any studies in the University without payment of tuition, and enjoy all University library privileges. Such graduates are required to pay only the usual residence fee in order to establish their active membership in the University. The use of laboratory space and equipment is contingent upon availability, and the cost of all laboratory or special library materials is paid by the graduate. Special arrangements for such privileges must be made with the Chairman of the Council. Post-doctoral work may not be applied toward any degree offered by the University.

REGULATIONS

Candidates and Fellows in the Graduate Council are subject to, and are expected to familiarize themselves with, the regulations regarding REGISTRATION, FEES AND FINANCES stated on pages 23-27, and the University regulations stated on pages 44-52.

RESIDENCE AND CONTINUOUS REGISTRATION

The Graduate Council expects all students to work on their doctoral programs in residence, although there is no formal regulation concerning the minimum amount of time of resident study either in preparation for the Council Fellowship Examination or as a Fellow of the Council engaged in doctoral research. The student who undertakes either part of the doctoral program on full or limited schedule must, in accordance with University regulations, maintain continuous registration under the Graduate Council even when the Council has granted a leave of absence for study or residence elsewhere. Failure to maintain registration in each term of the academic year disrupts the residence status of the student. In such case, the student must reapply for admission to the Council, under whatever new conditions and regulations are set up by his consultative committee or the member of the Council who directs his research.

TEACHING FELLOWSHIPS AND GRADUATE ASSISTANTSHIPS

A limited number of Teaching Fellowships are assigned annually to certain departments of instruction open to doctoral students registered under the Graduate Council. An announcement regarding qualifications and application for these fellowships will be sent upon request to the Office of the Graduate Council.

In many departments of instruction graduate assistants are appointed to assist in the academic program. Applicants should inquire directly of the executive officer of the department concerned regarding vacancies and details of appointment.

A pamphlet describing details of the Graduate Council program, together with a current list of fields of research offered by the Council, will be sent upon request to the Office of the Graduate Council.

THE SCHOOL OF MEDICINE

THE FACULTY •

Walter Andrew Bloedorn, A.M., M.D., Sc.D., *Dean of the School of Medicine*

Angus MacIvor Griffin, Ph.D., *Assistant Dean of the School of Medicine*

Thomas Martin Peery, A.B., M.D., *Director of Postgraduate Instruction*

Joseph Hiram Roe, Ph.D., *Professor of Biochemistry*

Walter Andrew Bloedorn, A.M., M.D., Sc.D., *Professor of Medicine*

Errett Cyril Albritton, A.B., M.D., *Fry Professor of Physiology*

Roger Morrison Choisser, B.S., M.D., *Professor of Pathology*

Leland Wilbur Parr, Ph.D., *Professor of Bacteriology*

Wintred Overholser, A.B., M.D., Sc.D., *Professor of Psychiatry*

Frederick A. Reuter, M.D., *Professor of Urology*

Harry Ford Anderson, M.D., *Professor of Dermatology and Syphilology*

Preston Alexander McLendon, B.S., M.D., *Professor of Pediatrics*

John Parks, M.S., M.D., *Professor of Obstetrics and Gynecology*

Brian Blades, A.B., M.D., *Professor of Surgery*

Paul Kenneth Smith, Ph.D., *Professor of Pharmacology*

James Winston Watts, B.S., M.D., *Professor of Neurological Surgery*

Chester Elwood Leese, Ph.D., *Professor of Physiology*

Thomas McPherson Brown, A.B., M.D., *Professor of Medicine*

Angus MacIvor Griffin, Ph.D., *Professor of Bacteriology*

Ronald Atmore Cox, A.B., M.D., *Professor of Ophthalmology*

Thomas Martin Peery, A.B., M.D., *Professor of Pathology*

William Woodrow Stanbro, M.D., *Professor of Radiology*

Charles Samuel Wise, B.S., M.D., *Professor of Physical Medicine and*

Rehabilitation

Carlton Raymond Treadwell, Ph.D., *Professor of Biochemistry*

Charles Seymour Coakley, M.D., *Professor of Anesthesiology*

Ira Rockwood Telford, Ph.D., *Professor of Anatomy*

Ernest Alfred Watson Sheppard, M.D., C.M., *Clinical Professor of*

Ophthalmology

Radford Brown, M.D., *Clinical Professor of Obstetrics and Gynecology*

Thomas Carlton Thompson, B.S., M.D., *Clinical Professor of Urology*

William Staton Anderson, A.B., M.D., *Clinical Professor of Pediatrics*

William Herndon Jenkins, M.D., *Clinical Professor of Otolaryngology*

• The President of the University, the Dean of Faculties of the University, and the Registrar of the University are members of the Faculty.

Paul Calabrisi, A.M., *Associate Professor of Anatomy*
Harold George Mandel, Ph.D., *Associate Professor of Pharmacology*
Victor Frederick Ludewig, A.B., B.S., *Superintendent of the University Hospital*

COMMITTEES •

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John Parks	Brian Blades
Angus MacIvor Griffin	

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John Parks	Brian Blades
Thomas McPherson Brown	Victor Frederick Ludewig

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John Parks, *Chairman*

Angus MacIvor Griffin	Howard Clemeth Piripont
-----------------------	-------------------------

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Brian Blades	Paul Kenneth Smith
Thomas McPherson Brown	

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Thomas Martin Peery	Carleton Raymond Treadwell
Calvin Trexler Klopp	

*The President of the University and the Dean of the School of Medicine are members ex officio of all committees.

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 Paul Kenneth Smith
 Ira Rockwood Telford
 Calvin Trexler Klepp
 Jeremiah Keith Cromer
 Errett Cyril Albritton
 Thomas Martin Peery
 Mary Louise Robbins
 Charlotte Patricia Donlan
 Howard Clemeth Pierpont

ADVISORY COMMITTEE ON REHABILITATION

Irene Gorski Tamagna, *Chairman*
 Thomas McPherson Brown
 John McCallum Evans
 Francis Liell Wenger
 John Pletch Adams
 James Richard Thistlethwaite

GENERAL INFORMATION

INTRODUCTORY

The School of Medicine of The George Washington University was opened in March 1825; of the medical schools now in existence in the United States, it is the eleventh in chronological order of founding. The

University Hospital and Dispensary were established in 1898 and made a part of the organization of the School.

The School is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. The degrees of the School of Medicine are recognized by all state examining boards.

PURPOSE AND AIMS

The purpose of the School of Medicine is to train physicians competent in the art and science of medicine, which includes general practice, further training for special practice, teaching, research, and medical administration.

On the undergraduate level the aims of the school are (1) to select for training students of superior aptitude and character; (2) to train students thoroughly in the theoretical principles and in the laboratory and clinical applications of the medical sciences; and (3) to provide a diversity of clinical experience with a wide range of clinical material, through well supervised clinical clerkships in federal, public, and private hospitals providing facilities for all specialized fields of medicine.

The aims of the School of Medicine in the fields of graduate and postgraduate instruction are (1) to provide interns and residents for a number of hospitals in the Washington area for advanced training in both general and specialized practice; (2) to direct an expanding program of fundamental and applied research, integrated with teaching at the School of Medicine, and in keeping with the increasing need for medical knowledge and the growth of Washington as one of the world's great centers of medical research; and (3) to provide postgraduate instruction in the most recent advances in research and in clinical medicine.

To achieve these objectives the School of Medicine has developed the systematic plan of instruction outlined below and a balanced, comprehensive curriculum. In carrying out its program the School seeks to maintain a faculty of appropriate size and outstanding ability, to make the most effective use of the expanding University facilities, and to take full advantage of the exceptional opportunities for clinical and research training in the Washington area.

ORIENTATION PROGRAM

A distinctive curricular feature of the George Washington University School of Medicine is a program for the orientation of students entering the School which is given to them during the first week of the regular academic year. The aims of the program are: (1) to acquaint the student with the School of Medicine and with the faculty

of the School of Medicine; (2) to bridge the gap between premedical and medical education; (3) to indoctrinate the student in the responsibilities and ethical principles upon which medical practice rests; (4) to help the student get an effective start in his medical studies.

The orientation course is given because it is recognized that students find medical school quite different from their previous college experience. The language is different, the techniques are more detailed, and the demands upon the students in quality and quantity of work are far more exacting. It has been found helpful to point out to the students that if at times they feel the requirements are too rigorous, they are being trained for decisions which may mean suffering or well-being, life or death, for patients who ultimately will be under their care. The subjects covered in the orientation course include an interpretation of the student out-look by the President of the current senior class, a discussion of the relationship between premedical and medical education, by a member of the Committee on Admissions, a thirty hour course in the evaluation of scientific evidence, the history of the School of Medicine, an explanation of the medical curriculum by the Chairman of the Committee on Curriculum, an introduction to the Medical Library with guidance on how to use it by the Chairman of the Library Committee, a statement of the ideals and aims of the medical profession by the Dean, a brief course in the history of medicine as related to the various pre-clinical and clinical subjects by heads of departments, a lecture on the relationship of the physician and the law by an eminent medical legal authority, a discussion of medical ethics and the patient-physician relationship, explanation of student health program, a presentation of basic concepts of health and disease by a Professor of Medicine, and practical advice to the students on how to study by a senior member of the faculty.

PLAN OF INSTRUCTION

The curriculum is a graded one beginning with fundamental aspects of the basic sciences and progressing gradually into the clinical teaching of the last two years. The teaching is organized systematically under the various departments of the School of Medicine as listed under Courses of Instruction in this CATALOGUE.

During the first year the student receives instruction in anatomy, biochemistry, and physiology, using the classroom and laboratory facilities of the School of Medicine. In order to emphasize the importance of the basic sciences, patients are studied from time to time and the relationship of these fundamental sciences to the clinical sciences is stressed.

In the second year, having completed the preliminary study of the structure and function of the normal body, the mechanisms of disease are considered. The various bacteria and other microbiologic agents

capable of producing disease are studied in the laboratory. The effects of various diseases upon the tissues of the human body are taught in pathology, serving as a basis for the understanding of disturbed structure and function. The mode of action of the various drugs and therapeutic agents is studied in the course in pharmacology as an introduction to the use of these agents in the treatment of patients. The student is taught to conduct a physical examination and to interpret and evaluate the various symptoms of disease. During the second term of this year patients are assigned to him for case study under the close supervision of his instructors. Introductory lectures in medicine, surgery, pediatrics, obstetrics and gynecology, neurology, radiology, and psychiatry are given during this period, preparing the student for his responsibility with patients in the hospital wards and clinics.

In the third year the student is assigned to the District of Columbia General Hospital for closely supervised clinical instruction. He serves as clinical clerk in the various divisions of the hospital and assists in the preparation of the clinical records and basic laboratory examinations. He learns to perform the common ward procedures and to use diagnostic and therapeutic equipment. During this period there are daily lectures and clinical demonstrations planned in an orderly fashion proceeding from simpler to more complex problems.

During the summer period following the third year the student is required to spend eight weeks in one of the various teaching facilities of the School of Medicine. This plan permits limited electives, so that the student may explore opportunities in the various specialties not ordinarily included in the medical curriculum.

In the fourth year the student spends most of his time in the study of ambulatory patients. This instruction is given in the clinics of the University Hospital, Children's Hospital, Mount Alto Hospital, Walter Reed General Hospital, and St. Elizabeths. In these various institutions members of the faculty continue to supervise the students in their evaluation of clinical problems by a careful review of each patient, and joint planning of treatment procedures. Stress is placed upon the total individual and his environment, since it is recognized that many factors, emotional and economic as well as physical, contribute to disease and must be considered if the individual is to be restored to health and effectiveness. Instruction in the basic sciences is continued in the fourth year in special conferences in which representatives of several departments of instruction participate.

By the completion of his four year course the student must have demonstrated that he has acquired the basic knowledge and experience necessary for advanced training on the internship.

EQUIPMENT AND FACILITIES

The George Washington University Hospital.—The hospital, with a capacity of 400 beds, was opened in 1948. This splendid edifice, which is one of the outstanding hospitals in the United States, is completely furnished with the latest and most scientific apparatus and equipment. Its purpose is to supplement existing hospital resources in the District of Columbia for the care of the sick and the injured; to educate physicians, nurses, and technicians; and to promote medical knowledge.

The hospital is staffed and controlled by the Faculty of the George Washington University School of Medicine and it provides excellent clinical material for the instruction of medical students. Virtually every specialty in the fields of medicine and surgery has assigned space and equipment in both the outpatient department and the bed-patient section of this modern institution.

Medical School Building.—The building housing the School of Medicine is a five-story structure with lecture rooms, classrooms, students' rooms, and the following laboratories: anatomy; bacteriology, hygiene, and preventive medicine; biochemistry; pathology; and pharmacology and physiology.

They are fully equipped to enable students to pursue adequately the laboratory courses and to acquire the technical skill necessary in modern clinical and investigative work.

Research Building.—The Research Building houses special laboratories for graduate and staff research in the Departments of Anatomy; Biochemistry; Pharmacology; Physiology; and Bacteriology, Hygiene, and Preventive Medicine. Special facilities are provided for the study of radio-active compounds, for tissue-culture techniques, and for virological procedures. Selected students are invited to participate in certain aspects of the research program either on a volunteer basis or with the support of special Research Scholarships.

The first floor of the building houses the Medical Library as well as photographic laboratories and other facilities for audio-visual aids to education.

Medical Library.—The Medical Library contains a selected reference collection of more than 10,000 volumes, currently obtains important new medical works, and regularly receives the principal medical journals.

Inter-library loan service is maintained by close cooperation with other medical and scientific libraries throughout Washington and vicinity.

The Medical Library is open from 9:00 A.M. to 9:00 P.M. each class day, Monday through Friday, and from 9:00 A.M. to 1:00 P.M. Saturday.

The Medical Library maintains a branch in Room 6037-A of the University Hospital for reference, research, and inter-library loan service. It is open from 2:00 to 6:00 P.M. Monday through Friday.

GOVERNMENT LIBRARIES AND MUSEUMS

The Armed Forces Institute of Pathology, on the grounds of Walter Reed Army Medical Center, affords unexcelled opportunity for study of conditions met in general medicine and surgery as well as those of peculiarly military significance. Its collection of anatomical and pathological specimens comprises material received from all areas of the world and is unequalled in this country. The Museum of Hygiene, the National Museum, the Smithsonian Institution, the Botanic Gardens, and the various collections of the Department of Agriculture all afford opportunity for study of materials of special interest in various areas of Medicine and its allied sciences.

CLINICS

Students at the George Washington University School of Medicine receive clinical training at the University Hospital, at the new University Cancer Clinic, and at five affiliated hospitals. In the very first year the medical student begins his work in the hospital as well as in the lecture halls and classrooms.

The University Hospital.—All clinics are under the supervision of the Dean, who is also Medical Director of the Hospital. This insures the highest possible utilization of available clinical material for teaching purposes and the proper supervision of clinicians and students; it brings the individual student into direct contact with patients and requires him to do, under authoritative supervision, the clinical and laboratory work necessary for diagnosis and treatment; and it permits proper interpretation of the conditions occurring during the progress of cases and promotes the keeping of adequate records. Clinical and clinico-pathological conferences are held in which the history of cases, the physical findings, laboratory records, and the post mortem pathology when available, are presented and correlated.

The Outpatient Department.—The Outpatient Department has clinical facilities for each Service in the Hospital. Fourth year students are assigned in rotation by section for clinical instruction in the Outpatient Department.

The George Washington University Cancer Clinic.—This modern building, opened in 1954, houses the Cancer Detection Clinic; the Helen L. and Mary E. Warwick Memorial; and special laboratories for research related to the nature, diagnosis, and treatment of cancer.

The facilities of the Cancer Detection Clinic are available to medical students. In addition the diagnosis and treatment of various forms of neoplasms are presented. The results of the treatment of neoplasms are evaluated by follow-up studies.

The Helen L. and Mary E. Warwick Memorial, for cancer and allied

diseases, was affiliated with The George Washington University in July 1948. The purposes of this clinic are (1) to provide care for cancer patients, through group consultations within a cancer organization, and (2) to provide training for students and physicians in the field of oncology.

The District of Columbia General Hospital, Washington's large city hospital, has 1,420 beds, an outpatient department in which 76,000 patient-visits are made each year. It provides clinical opportunities in virtually every branch of medicine and surgery.

Medical students receive clinical training in certain fields at the Walter Reed Army Hospital, one of the Armed Forces' outstanding teaching hospitals. Clinical experience in both medical and surgical subjects is also provided at the Mt. Alto Veterans Administration Hospital.

At Children's Hospital, one of the largest and best known hospitals for children in the United States, medical students receive training and clinical experience in Pediatrics, with both clinic and in-patient patients.

St. Elizabeths Hospital, which has recently celebrated the 100th anniversary of its founding, is one of the world's most famous mental hospitals. This hospital cares for 7,500 patients with virtually every known psychiatric and neurologic disorder. The George Washington University medical students begin their studies in psychiatry in their first year and these studies continue throughout the four years. Much of their clinical instruction in psychiatry and neurology is received at St. Elizabeths, and prominent psychiatrists and neurologists on the St. Elizabeths staff are members of the George Washington University School in Medicine faculty. Additional clinical experience in psychiatry and neurology is gained by students at the George Washington University Hospital Psychiatric Department in the Outpatient Department of the University Hospital, and special lectures and clinical work in child psychiatry are given in the Psychiatric Department of Children's Hospital.

ADMISSION, REGISTRATION, FEES AND FINANCIAL REGULATIONS

Students in the School of Medicine are subject to, and are expected to familiarize themselves with, the regulations stated on pages 12-27.

Registration in the School of Medicine is for a period of one academic year. After the student has entered the courses of instruction he is obligated for the full tuition for the academic year. No part of the tuition will be refunded upon withdrawal or dismissal for any cause. Acceptance by the School of a student's fee does not in any way obligate the School to accept the student for any subsequent year, and the student

is reserved to drop any student from the School whenever, in the interest of a student or the School, the Faculty deems it advisable to do so.

A fee of \$5 to defray the costs of completing the records for final consideration for admission must accompany each application. This fee applies to students whose premedical training was completed at this University as well as to students who have not previously attended this University. Fees for each term are \$425, payable in advance.

Because the number of applicants far exceeds the limit of each class, places can be reserved only for those qualified applicants who remit a deposit of \$100 which will be credited toward the tuition of the first term. Under no circumstances will this deposit be refunded.

Credit for work will not be given until, at the completion of a laboratory course, the student has replaced or paid for all articles of equipment or other University property which he has lost, broken, or destroyed. All breakage or loss not directly traceable to an individual student is assessed pro rata.

COST OF TEXTBOOKS AND STUDENT EQUIPMENT

The minimum cost of necessary textbooks and student equipment (microscope, drawing materials, glass slides, clinical thermometer, stethoscope, hemocytometer, uniforms, etc.) is approximately as follows: first year, \$400; second year, \$250; third year, \$125; fourth year, \$80; total, \$855.

A fee of \$1 a term is charged for the use (optional) of a locker.

REGULATIONS

Students in the School of Medicine are subject to, and are expected to familiarize themselves with, the general University regulations stated on pages 44-52.

ABSENCE

Absence consists in being away from a class or clinic during a scheduled period, entering after the class or clinic has begun, or leaving before either is dismissed.

Excuse for absence due to sickness must be accompanied by a certificate signed by the attending physician and must be filed in the Office of the Dean.

For every unexcused absence a department will deduct one half of one per cent from the student's final grade in the subject involved.

GRADES

The following grading system is used: *A* (90-100); *B* (80-89); *C* (70-79); *D* (65-74) condition; *E* (below 65) failure; *Inc.*, incomplete. The passing grade in each subject is *C*.

A student who is conditioned in any subject will not be advanced until such condition is removed and then only by authority of the Committee on Scholarship.

EXAMINATIONS

Examinations, which may be written, oral, or practical, will be held at the end of each term.

All students in the School of Medicine are required to take Part I and Part II of the National Board Examinations, except that students from those states and foreign countries which do not recognize the National Board may be exempted from Part II by action of the Committee on Scholarship.

PHYSICAL EXAMINATIONS

All first-year students are given a comprehensive physical examination upon admission to the School of Medicine. The students are informed of the findings and advised regarding such measures as will tend to maintain a high standard of health.

In addition medical students benefit from the complete Tuberculosis Case Finding Program which the School has maintained since 1938-39. Under this program all students receive tuberculin tests, X-ray examinations, and such special attention from chest specialists as is necessary to reduce to a minimum the dangers from tuberculosis. Students are immunized against those diseases for which proven prophylactics exist.

THE DEGREE OF DOCTOR OF MEDICINE

Upon the satisfactory completion of the requirements of the School of Medicine, the degree of Doctor of Medicine is conferred.

REQUIREMENTS FOR THE DEGREE

Every candidate for graduation with a degree of Doctor of Medicine must be at least twenty-one years of age, of reputable character, and free of all indebtedness to the University. He must have satisfied the admission requirements, completed satisfactorily not less than four academic years of study as a matriculated student in Medicine, completed all required courses, and passed satisfactorily all prescribed examinations.

COMBINED ARTS AND MEDICINE CURRICULUM

In order to be recommended for the degree of Bachelor of Arts, the candidate must complete at least ninety credit hours of prescribed college work (at least thirty credit hours and one year of residence must be completed in Columbian College, the senior liberal arts college), and the

first year of the medical curriculum. Upon satisfactory completion of the fourth year of the medical curriculum the student becomes eligible for the degree of Doctor of Medicine.

HONORS

A candidate who has completed the four-year medical course with an average grade of *A* may be recommended for graduation "with distinction".

INTERN AND RESIDENT TRAINING PROGRAM

The George Washington University Hospital offers rotating-type internships as classified by the National Intern Matching Programs, Inc. Twenty-five internships of one year each are offered; thirteen in the Department of Medicine with emphasis on medicine, ten in the Department of Surgery with emphasis on surgery, and two in the Department of Pathology with emphasis on pathology.

Rotating Internships, Emphasis on Medicine.—Interns will be assigned to seven months of general medicine, two months on the surgical service, and one month each on neuro-psychiatry, pediatrics, and obstetrics and gynecology.

Rotating Internships, Emphasis on Surgery.—Interns will be assigned to the surgical service for nine months, to general medicine for two months, and to obstetrics and gynecology for one month.

Rotating Internships, Emphasis on Pathology.—Interns will be assigned to the pathology service for eight months, to general medicine for two months, and to surgery for two months.

A total of approximately forty-two approved residencies are offered in anesthesiology, cardiac diseases, internal medicine, neurologic surgery, obstetrics gynecology, oral surgery, pathology, physical medicine, psychiatry, roentgenology, surgery and thoracic surgery. Residency programs are of from one to four years depending upon the service. Appointments are for one year subject to renewal. In several of the fields there are affiliations with local and government hospitals.

Fellowships of one or two years are available to acceptable candidates in anesthesiology, cardiology, chest diseases, infectious diseases, outpatient service, physical medicine, rheumatic diseases, surgery and thoracic surgery.

For application blanks and further information, address the Superintendent, The George Washington University Hospital, Washington 7, D. C.

POSTGRADUATE INSTRUCTION

The School of Medicine offers annually a series of short intensive postgraduate courses, varying somewhat from year to year. The series is

designed for physicians in practice. The significant advances in the various specialties are presented, together with summaries of older information.

The Kellogg Medical Lectures, inaugurated in 1948, are a series of evening lectures and clinics, presented by distinguished physicians from other cities, designed primarily for physicians practicing in Washington and the vicinity. They are also attended by the Faculty, postgraduate students, and members of the senior class of the School of Medicine.

During the academic year 1954-55 approximately 200 physicians were enrolled in postgraduate courses. For application blanks and further information, address the Director of Postgraduate Instruction, The George Washington University Hospital, Washington 7, D. C.

MEDICAL TECHNOLOGIST COURSE

The course for medical technologists consists of twelve consecutive months of didactic and practical work in all phases of clinical laboratory technique. The course meets the full requirements of the Registry of Medical Technologists of the American Society of Clinical Pathologists. Prerequisites are 60 credit hours (two academic years) of college work including required credits in biology and chemistry.

Two classes are accepted each year one entering in September and the other in March. Enrollment in each class is strictly limited so that personal instruction can be given.

Upon satisfactory completion of the course a certificate is awarded and the candidate is eligible for the certifying examination given by the Registry of Medical Technologists.

For application blanks and further information, address the Director of Laboratories, The George Washington University Hospital, Washington 7, D. C.

THE LAW SCHOOL

THE FACULTY AND STAFF OF INSTRUCTION*

John Theodore Fey, LL.B., M.B.A., J.S.D., *Dean of the Law School*
 Carville Dickinson Benson, A.B., LL.B., S.J.D., *Assistant Dean of the Law School*

Louis Harkey Mayo, B.S., LL.B., J.S.D., *Assistant Dean of the Law School*

David Benson Weaver, A.B., LL.B., *Director of Continuing Legal Education*

Charles Sager Collier, A.B., LL.B., S.J.D., *Professor of Law*

William Thomas Fryer, A.B., LL.B., J.D., *Professor of Law*

Carville Dickinson Benson, A.B., LL.B., S.J.D., *Professor of Law*

James Forrester Davison, A.B., LL.B., LL.M., S.J.D., *Professor of Law*

James Oliver Murdock, Ph.B., LL.B., *Professor of Law*

Oswald Symister Colclough, B.S., LL.B., LL.D., *Professor of Law*

John Theodore Fey, LL.B., M.B.A., J.S.D., *Professor of Law*

James Ward Morris, A.B., *Adjunct Professor of Law*

James Robert Kirkland, A.B., LL.B., LL.M., *Adjunct Professor of Law*

Boltha James Laws, LL.B., LL.M., LL.D., *Adjunct Professor of Law*

Conder Caywood Henry, A.B., LL.B., *Adjunct Professor of Law*

John Wingfield Jackson, B.S., LL.B., *Adjunct Professor of Law*

Frank Hammett Myers, LL.B., LL.M., *Adjunct Professor of Law*

John Albert McIntire, A.B., LL.B., *Professorial Lecturer in Law*

Justin Lincoln Edgerton, A.B., LL.B., *Professorial Lecturer in Law*

Philip Field Herrick, A.B., LL.B., LL.M., *Professorial Lecturer in Law*

George Edward Monk, A.B., LL.B., LL.M., *Professorial Lecturer in Law*

Frederick Bernays Wiener, Ph.B., LL.B., *Professorial Lecturer in Law*

Charles James Zinn, A.B., LL.B., LL.M., S.J.D., *Professorial Lecturer in Law*

Robert McKinney Cooper, Ph.M., J.D., *Associate Professor of Law*

Leroy Sorenson Merrifield, A.B., LL.B., M.P.A., *Associate Professor of Law*

John Patrick Burke, A.B., LL.B., *Associate Professor of Law*

Herman Israel Orentlicher, A.B., LL.B., *Associate Professor of Law*

David Benson Weaver, A.B., LL.B., *Associate Professor of Law*

Louis Harkey Mayo, B.S., LL.B., J.S.D., *Associate Professor of Law*

*The President of the University, the Dean of Faculties of the University, the Dean and Assistant Deans of the School, the Registrar of the University, the Director of Admissions of the University, Professors, Adjunct Professors, Associate Professors, and Assistant Professors constitute the Faculty.

Glen Earl Weston, B.S., LL.B., *Associate Professor of Law*
 Joseph Patrick Driscoll, A.B., LL.B., *Associate Professor of Law*
 William Thomas Mallison, Jr., A.B., LL.B., *Associate Professor of Law*
 Joseph Dach, LL.D., LL.B., *Lecturer in Law*
 John Joseph Czyzak, A.M., LL.B., *Lecturer in Law*
 Milton Paul Kroll, A.B., LL.B., *Lecturer in Law*
 Louis James Harris, A.B., LL.B., S.J.D., LL.M., *Lecturer in Law*
 Eugene William Geniesse, B.S.E., M.S., LL.B., *Lecturer in Law*
 Frazer Frost Hilder, A.B., J.D., *Lecturer in Law*
 William Wolcott Goodrich, LL.B., *Lecturer in Law*
 Vincent Kleinteld, LL.B., *Lecturer in Law*
 Paul Archibald Rose, LL.B., *Lecturer in Law*
 John Alexander Kendrick, A.B., LL.B., *Clerk of the Trial Practice Court*
 Dudley Graham Skinner, LL.B., *Associate Clerk of the Trial Practice Court*

COMMITTEES •

THE DEAN'S COUNCIL

William Thomas Fryer	Carville Dickinson Benson
James Forrester Davison	James Oliver Murdock
Robert McKinney Cooper	Leroy Sorenson Merrifield
Herman Israel Orentlicher	

COMMITTEE ON ADMISSIONS

	Carville Dickinson Benson, <i>Chairman</i>
Louis Harkey Mayo	Harold Griffith Sutton

COMMITTEE ON GRADUATE STUDIES

	James Forrester Davison, <i>Chairman</i>
James Oliver Murdock	Leroy Sorenson Merrifield
Robert McKinney Cooper	

COMMITTEE ON SCHOLARSHIP

	John Patrick Burke, <i>Chairman</i>
Carville Dickinson Benson	Louis Harkey Mayo

COMMITTEE ON CURRICULUM

	Herman Israel Orentlicher, <i>Chairman</i>
William Thomas Fryer	James Forrester Davison
Robert McKinney Cooper	David Benson Weaver

* The President of the University, the Dean of Faculty of the University, and the Dean and Associate Deans of the Law School are members ex officio of all committees.

LIBRARY COMMITTEE

James Oliver Murdock, *Chairman*

Glen Earl Weston

William Thomas Mallison, Jr.

GENERAL INFORMATION

INTRODUCTORY

LOCATION IN THE NATION'S CAPITAL

The George Washington University Law School, now in its 90th year, is the oldest law school in the District of Columbia. The School took part as a charter member in 1900 in the organization of the Association of American Law Schools and it has been an active member of the Association since that time. It is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association.

National University, which has had an important place in legal education in the District of Columbia since 1869, was merged into The George Washington University in August 1954.

Of special significance is the location of the Law School in the Nation's Capital, the focal point of the law in action, both American and international. The work of the School goes on in this environment, presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. The years of residence at law school are years of participation in the life of the community, which, in the case of the George Washington University Law School, is the government of the United States by law. As a consequence, the study of law takes on added meaning, whether the goal be government service or private practice, general or specialized.

OBJECTIVES

The primary purpose of the Law School is to prepare men and women to meet the needs of society in the many fields of law, public and private. These needs call not only for technical skill but also for responsible leadership in the development of the law and the administration of justice. In fulfilling these responsibilities the Law School offers: (1) a program of study in preparation for the practice of law; (2) programs of study and research on the graduate level for foreign as well as for American students; (3) a continuing legal education program for members of the bar; (4) institutes and forums on current topics in domestic and foreign law; (5) the publication of a law journal containing the results of research in public law; and (6) encouragement of student professional and extracurricular activities.

PROGRAMS OF STUDY

Traditionally the Law School has been national in the geographic distribution of its students. At the present time, men and women holding baccalaureate degrees from more than three hundred colleges and universities come from the forty-eight states, the territories, and several foreign countries to comprise the student body. As a consequence the programs of study leading to the degrees of Bachelor of Laws and Juris Doctor have been planned to provide instruction and training for the practice of law wherever the Anglo-American legal system obtains.

Graduate work leading to the degrees of Master of Laws and Doctor of Juridical Science is offered for those desiring further study and research in specialized fields of law.

Provision is made for advanced study by members of the bar who do not desire to register as candidates for degrees. Lawyers may take courses for this purpose either as unclassified graduate students or as continuing legal education students.

Graduate work is offered also to meet the needs of lawyers who come from countries whose legal systems are not based on the English law. There are two programs of study, one leading to the degree of Master of Comparative Law for the lawyers planning to return to their own countries, and the other leading to the degree of Master of Comparative Law (American Practice) for lawyers planning to remain in this country for the practice of law.

FALL, SPRING, AND SUMMER TERMS

There are three terms: fall, spring, and summer. Students may enter the Law School at the beginning of any of the three terms. The academic year consists of the fall and spring terms.

MORNING AND EVENING DIVISIONS

The School maintains an evening division. The evening division conforms to the standards of the morning division and has the same teaching staff.

HOURS OF INSTRUCTION

Morning sections: Monday through Friday, 9:10 A.M. to 1:00 P.M.
Trial Practice Court: Saturday 9:30 to 11:30 A.M.
Evening sections: Monday through Friday, 5:50 to 7:40 P.M.

THE LIBRARY

The Law Library of 48,000 volumes contains the official reports of the decisions of the courts of last resort of all the states prior to the National Reporter System, and of some states complete to date.

National Reporter System, complete; the reports of the United States Supreme Court and lower federal courts, and the reports of federal administrative agencies; Shepard's Citations for the units of the Reporter System; the English Reports, Full Reprint; the English Law Reports; the Times Law Reports; the Dominion Law Reports; the United States statutes and codes; complete sets of statutes of all the states; the English statutes; the principal English and American digests and encyclopedias; collections of special reports and annotated cases; United Nations documents, leading textbooks and treatises; and practically complete sets of about 150 legal periodicals. A section of the Library, consisting of books acquired from National University, is known as the National University Law Collection.

The international law collection, formerly the library of the Carnegie Endowment for International Peace, is available to law students.

The Library, which is on the fourth floor of Stockton Hall, is open from 9:00 A.M. to 10:00 P.M., Monday through Friday; from 9:00 A.M. to 5:00 P.M. on Saturday; and from 2:00 to 6:00 P.M. on Sunday. Books and other materials do not circulate and must be used in the library.

THE LAW REVIEW

The George Washington Law Review, published by the University, is edited and managed by students of the Law School under the supervision of Faculty advisors. It is devoted exclusively to state and federal public law. The location of the University in the National Capital, where the primary sources of federal public law may be observed in operation, affords an unexcelled opportunity for specialization in this field.

The *Review* organization includes a faculty editor-in-chief, an associate faculty editor, a faculty board of advisory editors, a board of deputy mental advisory editors, and a board of student editors. The student editors are chosen each year on the basis of scholarship.

THE STUDENT BAR ASSOCIATION

Every student in the Law School is a member of the Student Bar Association, which is organized to enable students to become better acquainted with problems of the profession, to foster professional ideals, and to bring about closer contact with members of the profession engaged in active practice of the law.

The work of the Student Bar Association is carried on by various committees and by group and general meetings of a professional and social nature. From time to time lectures are given by outstanding authorities on legal and professional problems.

An important activity is the Van Vleck Case Club Competition, which provides an opportunity for training in appellate advocacy. First and

second year students participate as contestants before courts composed of members of the Faculty and the local bar. Senior law students of the Case Club also sit as judges. The final argument is held before a court composed of distinguished federal judges.

ORDER OF THE COIF

The Order of the Coif, a national honor society with chapters in over forty law schools, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University Chapter was established in 1926. Members are elected each year from the highest-ranking 10 per cent of the graduating class of the Law School.

REGULATIONS

Students in the Law School are subject to, and are expected to familiarize themselves with, the following regulations and the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 12-27, and the University regulations stated on pages 44-52.

AMOUNT OF WORK

Students without substantial outside employment may take a program of studies of fourteen hours a week in which the majority of hours must be in the morning sections. Students, whether in the morning or evening division, with substantial outside employment must take a limited program of studies not exceeding ten hours a week. Students taking a majority of their classes in the evening may not take more than ten hours a week. A minimum schedule of ten hours in the morning division and six hours in the evening division is required except in exceptional circumstances when authorized by the Dean.

ATTENDANCE

Regular attendance at classes is required and is necessary for successful work. A student who is deficient in class attendance in any course may, by action of the Faculty, be barred from taking the examination.

Attendance at classes is limited to students registered to take them for credit. "Auditing" classes is not permitted.

RESIDENCE REQUIREMENTS

Candidates for the degree of Bachelor of Laws must complete a residence period of three academic years. Attendance in the morning division for the fall and spring terms constitutes residence for an academic year; similar attendance in the evening division constitutes residence for

three-fourths of an academic year. Consequently, a morning student must attend six terms to meet residence requirements; an evening student must attend eight. Students authorized to take schedules of less than ten hours in the morning division in any particular term, or less than six hours in the evening division, receive residence credit on a proportional basis. Students who attend the summer term receive fractional residence credit.

Students planning to attend summer school sessions at other law schools and desiring to use credits obtained at such schools in their course at this Law School must first have the courses they wish to take approved by the Dean. In no event will credits be recognized in excess of those which might be obtained in a similar period in this School.

A student admitted with advanced standing must complete one academic year of residence and pass twenty-eight credit hours with an average of at least *C* in order to qualify for the degree of Bachelor of Laws.

EXAMINATIONS

Written examinations are held at the end of each course. Every student is required to take the regular examinations unless excused. No excuse for absence will be granted except by the Dean and then only for illness or other emergency. Application for excuse must be made in writing not later than one month after the date of the examination. A grade of *NG* (no grade) will be entered on the record of a student thus excused, and he may take the next regularly scheduled examination in the course for which the excuse has been granted.

No special examinations will be given; except that, upon written application to the Dean, showing sufficient cause, a candidate for a degree at a convocation before the next regular examination, if he would be entitled to take a postponed examination, may, at the discretion of the Faculty, be given a special examination.

If a student fails to take an examination, a grade of *F* (to be counted as zero) will be recorded unless the student has obtained the Dean's permission to drop the course according to regulations stated on pages 44 and 45 or to be excused from the examination.

GRADES

Grades are indicated by the letters *A*, excellent, 85-100; *B*, good, 75-84; *C*, satisfactory, 65-74; *D*, poor, 55-64—below standard for graduation; *F*, failed—below 55; and *NG*, no grade—student excused from failure to take regularly scheduled examinations. See "Examinations" above, for grade upon failure to take an examination. The grades *A*, *B*, *C*, and *D* mean that the work has been completed and credit given for the courses. *F*, failed, means that no credit will be given. To obtain

credit the student must repeat the course; but a student who has obtained an average of *C* in the work of the term just completed and the preceding term and received a grade of *F* in only one course during those terms may take the next regular examination in that course, or a special examination at the end of the next term if he is a candidate for a degree at a convocation before the next regular examination. If on such reexamination he receives a passing grade he will be given credit in the course. Both grades are recorded.

EXCLUSION AND PROBATION FOR POOR SCHOLARSHIP

Candidates for the Degrees of Bachelor of Laws and Juris Doctor.—A student who in one term, or two successive terms, fails in courses aggregating eight or more credit hours will be excluded, except that if currently registered he will be permitted to complete the work of the term. Such a student is not eligible thereafter to be registered in the Law School or to attend classes. While excluded he may, however, with the consent of the Faculty, be admitted to the next regular examinations in those courses in which he has made a grade below passing, and if he receives a grade of passing in those courses with an average sufficient to make his cumulative average not less than *C*, he will be reinstated.

A student not subject to exclusion under the foregoing rule who at any time fails to maintain a cumulative average of at least *C*, will be placed on probation. A student on probation may at the discretion of the Dean be required to reduce his program of study. If a student on probation does not, by the end of the second term following that in which his average has fallen below *C*, receive grades sufficient to give him a cumulative average of at least *C*, he will be excluded, except that if currently registered he will be permitted to complete the work of the term.

The cumulative average of a student includes all the grades in all the courses taken while he is in the Law School as a candidate for a particular degree. When a course is repeated or a reexamination is taken, both the first grade and the subsequent grade or grades are counted in the cumulative average.

In special cases in which a student who has been excluded can clearly demonstrate that his low grades were due to special circumstances beyond his control and that he has the capacity to pursue the study of law with a *degree* likelihood of success, such student may be readmitted by the Faculty subject to such conditions as the Faculty may impose.

Candidates for Graduate Degrees.—A candidate for one of the graduate degrees whose work is not satisfactory in the opinion of the Faculty, taking into consideration the requirements and standards for the degree, may, by action of the Faculty, be excluded at the end of the term for which he is currently registered.

Unclassified Students.—An unclassified student whose work is not satisfactory in the opinion of the Faculty may, by action of the Faculty, be excluded at the end of the term for which he is currently registered.

CLASSIFICATION OF STUDENTS

Students are divided into classes on the completion of credit hours as follows: first year, one through twenty-eight; second year, twenty-nine through fifty-six; third year, fifty-seven or more.

THE DEGREES OF BACHELOR OF LAWS AND JURIS DOCTOR

The programs of study leading to the degrees of Bachelor of Laws and Juris Doctor are addressed to the development and application of legal principles, skills, and ideals which are indispensable to the equipment of a lawyer for professional responsibility and leadership in modern society. They include, first and foremost, the traditional core of legal education, namely, the study of legal materials—judicial, statutory, and administrative—and instruction in the technique of their use. These programs include the study of the nature and purpose of law, the history of the Anglo-American legal system, and the history and standards of the legal profession; practice in the skills of legal research and legal writing; elementary training in trial practice, and, through the medium of seminars, experience in group handling of legal problems.

REQUIREMENTS FOR THE DEGREES

Bachelor of Laws

To be recommended for the degree of Bachelor of Laws (LL.B.) the student must have completed a residence period of not less than three academic years (four years for evening students) and eighty credit hours, with a cumulative average of at least C.

Juris Doctor

The degree of Juris Doctor (J.D.) is conferred as a recognition of the completion at the George Washington University Law School, with high rank, of the required program of study for the Bachelor's degree, including experience in research and legal authorship. To be recommended for this degree the student must have completed: (1) a residence period of not less than three academic years (four years for evening students) in the Law School; (2) eighty credit hours with a cumulative average of at least B including one of the following courses: Comparative Law, Jurisprudence, or one of the graduate seminars; and (3) one year of acceptable service on the board of student editors of *The*

George Washington Law Review, election to which is subject to regulations laid down by the Faculty.

HONORS

The degree of Bachelor of Laws or of Juris Doctor "with distinction" will be awarded students who obtain a cumulative average of *A*.

CURRICULUM

Required and Elective Courses.—A program of required and elective courses has been developed in order to assure coverage of the basic courses as well as to allow a degree of flexibility to meet the diverse interests of students. All first-year courses, three second-year courses, and one third-year course are required, leaving a total of thirty-six hours of electives. In general, second-year students are restricted to second-year electives but in appropriate cases the taking of third-year electives will be approved. Similarly, specially qualified third-year students may secure approval to take graduate courses and research in public law.

Practice and Trial Practice Court.—Classroom instruction is conducted in pleading and procedure, trial and appellate practice, and evidence. This instruction includes grounding in the principles of the Federal Rules of Civil Procedure and the Federal Rules of Criminal Procedure. In addition, each senior student is required to participate in the work of the Trial Practice Court, which includes the trying of cases as junior counsel and as senior counsel. A special section of the court is devoted exclusively to the trial of patent cases. Experience in preparing and arguing appellate court cases is available through the Case Club Connection.

Patent Law.—Students interested in patent law should take the following group of courses: United Trade Practices, Substantive Patent Law, Patent Office Practice, Patent Trial Practice Court, Federal Anti-Trust Laws, and Trade Regulation Seminar.

Curriculum.—Following is the curriculum for students beginning in the fall term. Adjustments are made to meet the needs of students beginning in the spring and summer terms.

Morning Division

FIRST YEAR		CREDIT HOURS
FALL TERM	SPRING TERM	
Legal Method and Legal System	Real Property	4
Contracts I	Contracts II	2
Personal Property	Torts	4
Criminal Law and Procedure	Constitutional Law	4
Total	Total	14

SECOND YEAR

FALL TERM	Credit Hours	SPRING TERM	Credit Hours
Civil Procedure	4	Evidence	4
Conveyances and Wills	2	Conveyances and Wills (continued)	2
Electives	8	Electives	8
Total	14	Total	14

THIRD YEAR

FALL TERM	Credit Hours	SPRING TERM	Credit Hours
Trial Practice Court	2	Trial Practice Court	2
Electives	10	Electives	10
Total	12	Total	12

Evening Division

FIRST YEAR

FALL TERM	Credit Hours	SPRING TERM	Credit Hours
Legal Method and Legal System	4	Torts	4
Contracts I	4	Contracts II	2
Personal Property	2	Concurrent Law and Procedure	4
Total	10	Total	10

SECOND YEAR

FALL TERM	Credit Hours	SPRING TERM	Credit Hours
Real Property	4	Constitutional Law	4
Legal Procedure	4	Evidence	4
Conveyances and Wills	2	Conveyances and Wills (continued)	2
Total	10	Total	10

THIRD YEAR

FALL TERM	Credit Hours	SPRING TERM	Credit Hours
Electives	10	Electives	10
Total	10	Total	10

FOURTH YEAR			
FALL TERM	Credit Hours	SPRING TERM	Credit Hours
Trial Practice Court	2	Trial Practice Court	2
Electives	8	Electives	8
Total	10	Total	10

GRADUATE PROGRAM

DEGREES OF MASTER OF LAWS AND DOCTOR OF JURIDICAL SCIENCE

The administration of justice under law is a matter so vast and complex that some graduates feel the need for further study in order to broaden and deepen their understanding of the law. Others desire to extend their study into rapidly developing specialized fields. Graduate instruction, leading to the degree of Master of Laws, is therefore offered to enable qualified students to attain one or both of these objectives.

The degree of Doctor of Juridical Science is offered for selected students whose aim is to extend still further their studies by pursuing original research in law.

Graduate work is available to evening as well as morning students in order that lawyers in private practice and in government service may engage in advanced study or in original research.

PROGRAMS OF STUDY FOR FOREIGN LAWYERS

Two programs of study are provided to meet the needs of lawyers who come from countries whose legal systems are not based on the English law. For such lawyers, whose aim is to acquire an understanding of our system so that they may work intelligently with its materials and practitioners after returning to their own countries, there is available the degree of Master of Comparative Law. For foreign lawyers, however, who wish to remain in this country to practice law, there is available the degree of Master of Comparative Law (American Practice) with an appropriate program of study. With respect to both programs, the students are not assigned to special classes but work in association with the other students in the regular courses, each student's program being adapted to his individual needs.

NON DEGREE STUDY: CONTINUING LEGAL EDUCATION

As a result of changes and expansion in various fields of the law many lawyers pursue graduate study in order to keep abreast of current developments. Consequently, an important part of the graduate program

is to provide for members of the bar not desirous of becoming degree candidates. The offerings in the field of governmental regulation provide opportunities for specialization. Although third year and graduate courses are particularly suitable, first year and second year courses may be taken in appropriate cases. Members of the bar taking graduate work in this way register as unclassified students or as continuing legal education students.

RESEARCH IN PUBLIC LAW

Research in public law is conducted under the supervision of members of the Faculty. The purpose of this research is to furnish means for training specialists in public law, either as government lawyers or as lawyers representing individuals or corporations in cases in which the Government is a party, and to assist in the analysis, clarification, formulation, and improvement of public law, substantive and procedural.

Candidates for the graduate degrees in the Law School and specially qualified seniors may pursue this work.

REQUIREMENTS FOR THE DEGREES

Master of Laws

To be recommended for the degree of Master of Laws (LL.M.) the student must have completed a residence period of not less than two terms. Such residence should normally be continuous. All requirements for the degree must be completed in this Law School and in a period not exceeding two years after registration for work for the degree. The student must have completed with a minimum average of *B* twenty credit hours in courses listed in the law curriculum as graduate courses except that in appropriate cases third year courses may be approved for inclusion in the program of study if not previously taken.

Master of Comparative Law

The degree of Master of Comparative Law (M.Comp.L.) is for foreign students who intend to return to their countries. To be recommended for this degree the student must have completed a residence period of not less than one academic year. He must have completed satisfactorily twenty-four credit hours in approved courses in the curriculum of the Law School or of such other departments of the University as the Faculty of the Law School shall approve.

Master of Comparative Law (American Practice)

The degree of Master of Comparative Law, American Practice (M.Comp.L.(Am.Prac.)) is for foreign students who intend to remain in this country. To be recommended for this degree the student must

have completed a residence period of not less than one academic year. He must have completed twenty-eight credit hours in approved courses in the curriculum of the Law School with a cumulative average of at least C.

Doctor of Juridical Science

To be recommended for the degree of Doctor of Juridical Science (S.J.D.) the student must have completed a residence period of not less than one academic year. He must have pursued a course of study and research designated by his consultative committee and approved by the Committee on Graduate Studies. At the conclusion of his first year of residence, or at such other time as the Committee on Graduate Studies may set, the candidate must pass an oral examination in those fields of study selected by the consultative committee. This examination shall be conducted by the consultative committee and such other members of the Faculty and qualified experts from other research institutions as may be selected by the Committee on Graduate Studies.

Not later than the date specified in the University calendar the candidate must submit to the Dean one typewritten original and two legible and complete carbon copies of his dissertation in its final form. The dissertation must contain a summary of from 2,500 to 3,000 words inserted as an appendix. An additional original typewritten copy of this summary must be submitted for publication. To be acceptable the dissertation must, in the opinion of the examining committee, constitute a substantial contribution to the field of law concerned and be suitable for publication. Additional information will be supplied by the Chairman of the Committee on Graduate Studies.

The summaries of accepted dissertations will be printed in a volume forming a number of the University BULLETIN. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover the expense of printing the summary of his dissertation.

THE SCHOOL OF ENGINEERING

THE FACULTY AND STAFF OF INSTRUCTION •

Martin Alexander Mason, B.S. in Eng., Ing.-Dr., *Dean of the School of Engineering*

Thomas Benjamin Brown, Ph.D., *Professor of Physics*

Richard Norman Owens, Ph.D., C.P.A., *Professor of Business Administration*

Norman Bruce Ames, M.S., E.E., LL.B., *Professor of Electrical Engineering*

James Henry Taylor, Ph.D., *Professor of Mathematics*

Frank Mark Weida, Ph.D., *Professor of Statistics*

Benjamin Carpenter Cruickshanks, B.S. in M.E., *Professor of Mechanical Engineering*

Florence Marie Mears, Ph.D., *Professor of Mathematics*

Charles Rudolph Naeser, Ph.D., *Professor of Chemistry*

Carl Hugo Walther, B.E., M.C.E., *Professor of Civil Engineering*

Bruce Douglas Greenshields, C.E., Ph.D., *Professor of Civil Engineering*

Martin Alexander Mason, B.S. in Eng., Ing.-Dr., *Professor of Civil Engineering*

Forest Claire Harris, Ph.D., *Professorial Lecturer in Electrical Engineering*

Waldo Edward Smith, B.E. in C.E., M.S. in C.E., *Professorial Lecturer in Civil Engineering*

Victor Szebehely, Dr.Eng., *Professorial Lecturer in Mechanical Engineering*

Glen Darwin Camp, Ph.D., *Professorial Lecturer on Engineering Administration*

Robert Irving Sarbacher, Sc.D., E.E., *Professorial Lecturer on Engineering Administration*

Gilbert Chester Jacobus, B.S., M.B.A., LL.B., *Professorial Lecturer on Engineering Administration*

Kenneth McClure, M.S., LL.B., *Professorial Lecturer on Engineering Administration*

* The President of the University, the Dean of Engineers at the University, the Dean of the School, the President of the University, the President of the University, the President of the University, the President of the University, and Assistant Professors constitute the Faculty.

- Rawlings Stine Poole, B.S., *Professorial Lecturer on Engineering Administration*
- Ralph Edward Fuhman, B.S. in C.E., M.S. in Eng., D.Eng., *Professorial Lecturer in Civil Engineering*
- Robert Betchov, Ph.D., *Professorial Lecturer in Mechanical Engineering*
- Robert Gay Trumbull, B.S. in C.E., *Associate Professor of Mechanical Engineering*
- Raymond Pugh Eymann, C.E., *Associate Professor of Civil Engineering*
- Robert Corbin Vincent, Ph.D., *Associate Professor of Chemistry*
- Robert Hamilton Moore, Ph.D., *Associate Professor of English*
- Charles Edward Greeley, B.S. in M.E., *Associate Professor of Mechanical Engineering*
- Haaren Albert Miklofsky, B.C.E., M.Eng., D.Eng., *Associate Professor of Civil Engineering*
- John Kaye, M.S. in M.E., *Associate Professor of Mechanical Engineering*
- Lewis Slack, Ph.D., *Associate Professor of Physics*
- James Coogan, Ph.D., *Associate Professor of Economics*
- Donald Joseph Hamahan, B.E.E., *Assistant Professor of Electrical Engineering*
- Paul Arthur Crafton, B.M.E., M.S., *Lecturer in Mechanical Engineering*
- Harold Burton Simpson, A.M., *Lecturer on Engineering Administration*
- John Gordon Hammer, M.C.F., Ph.D., *Lecturer in Civil Engineering*
- Hugh E. Lloyd Skyles, *Lecturer in Electrical Engineering*
- Bernard Bernstein, B.M.E., M.S., *Lecturer in Mechanical Engineering*
- Frank Joseph Powell, Jr., M.S., *Lecturer in Mechanical Engineering*
- Richard Edward Nearman, B.M.E., *Associate in Mechanical Engineering*
- Harold Valdemar Oerting, B.S. in E.E., *Lecturer in Electrical Engineering*
- Benjamin Franklin Shogloff, B.S. in E.E., *Lecturer in Electrical Engineering*
- George Pick, B.E.E., *Lecturer in Electrical Engineering*
- Kernut Milton Lovewell, B.S. in E.E., *Lecturer in Electrical Engineering*
- William Herbert Gossard, A.B., M.S. in E.E., *Lecturer in Electrical Engineering*
- George Abraham, M.S., *Lecturer in Electrical Engineering*
- William Walter Balwanz, B.E.E., M.S. in E.E., *Lecturer in Electrical Engineering*
- Donald Walter Lynch, M.S. in E.E., *Lecturer in Electrical Engineering*

Clifford Weeks Schmitz, Jr., B.S. in E.E., *Lecturer in Electrical Engineering*

Richard Henry Welles, B.C.E., *Lecturer in Civil Engineering*

George Bott, M.S., *Lecturer on Engineering Administration*

James Milton Headrick, M.S. in E.E., *Lecturer in Electrical Engineering*

Walter Bron, B.M.E., M.S. in Met., *Lecturer in Civil Engineering*

COMMITTEES •

THE DEAN'S COUNCIL ‡

1956

Carl Hugo Walther

Charles Edward Greeley

1957

Norman Bruce Ames

Bruce Douglas Greenshields

1958

James Henry Taylor

Haaren Albert Miklofsky

COMMITTEE ON ADMISSIONS AND ADVANCED STANDING

Norman Bruce Ames, *Chairman*

Benjamin Carpenter Cruickshanks

Haaren Albert Miklofsky

COMMITTEE ON SCHOLARSHIP

The Dean of the School, *Chairman*

Thomas Benjamin Brown

Benjamin Carpenter Cruickshanks

Haaren Albert Miklofsky

James Henry Taylor

Carl Hugo Walther

John Kaye

COMMITTEE ON GRADUATE STUDIES

Thomas Benjamin Brown

Norman Bruce Ames

Carl Hugo Walther

Vinton Seabolt

John Kaye

Richard Norman Owens

James Henry Taylor

Forest Kline Harris

Haaren Albert Miklofsky

Keith Harder (Liaison Member)

* The President of the University and the Dean of the School of Engineering are members ex officio of all committees.

‡ Chaired by the Faculty.

THE ADVISORY COUNCIL

ALLEN VARLEY ASTIN, Ph.D.

Director of the National Bureau of Standards

LYMAN JAMES BRIGGS, Ph.D., Sc.D., LL.D.

Trustee of the University

HUGH LATIMER DRYDEN, Ph.D., Sc.D., D.F.

Director of Research at the National Advisory Committee for Aeronautics

RALPH LEON COLTZENBERGER, B.S., E.E.

Vice-President of the Minneapolis-Honeywell Regulator Company

CHARLES HOOK TOMPKINS, D.E.

President of the Charles H. Tompkins Company, Trustee of the University

DANIEL CHARLES WALSER, B.S.

Consulting Engineer; Chairman of the District of Columbia Board of Registration for Professional Engineers

The Council is made up of friends of the University who are intimately familiar with the educational needs of the professional community served by the School. The Council is advisory to the Dean of the School of Engineering; it serves the function of relating the School to the educational requirements of the engineering and scientific constituency served by the School.

GENERAL INFORMATION

INTRODUCTORY

The School of Engineering was organized in 1884 as the Columbian Scientific School. In 1903 that school **was combined** with Columbian College in the Department of Arts and Sciences. In 1905 the engineering courses were placed under an administrative organization known as the Washington College of Engineering, and in 1909 the name was changed to the College of Engineering and Mechanic Arts. In 1914 the name became the School of Engineering.

Curricula leading to the degrees of Bachelor of Civil Engineering, Bachelor of Mechanical Engineering, and Bachelor of Electrical Engineering, are accredited by the Engineers' Council for Professional Development, the recognized accrediting body of the engineering profession.

OBJECTIVE

The objective of the School of Engineering is to produce graduates who possess knowledge and understanding of the fundamental scientific principles in their fields of study; some skill in their application; and an attitude of responsibility toward society and the engineering profession.

ADVISORY SYSTEM

Every student entering the School of Engineering as a degree candidate is assigned a permanent faculty adviser, for the purpose of guiding the educational career of the student, providing assistance in his professional development as an engineer, establishing close relations between the faculty and the student, and furnishing counsel and advice in all phases of the academic career of the student.

Faculty advisers counsel students on their programs of study, the achievement and maintenance of satisfactory scholastic performance, professional development, extra-curricular activity as part of the educational process; and assist the entering student in orientation in the engineering discipline. The adviser represents the student in all cases requiring faculty action.

Students are required to obtain their advisers' approval of programs of study prior to registration.

A student who has not completed the course work specified for the freshman and sophomore years is required to consult his adviser when so directed by the Dean, and to follow the recommendations of his adviser in all academic matters. However, advisers may not deny a student entry into any course or activity to which he is entitled under the regulations of the School of Engineering. Students having junior or senior status are encouraged to consult their advisers. The Dean acts as temporary adviser to entering or transfer students pending assignment of their permanent advisers.

All students are encouraged to discuss college problems with their advisers or instructors at any time; and parents or guardians are invited to consult with the Dean and advisers, in respect to any student problems.

Faculty advisers discharge their counseling duties in accordance with the high principles of their professional responsibility; however, the final responsibility for a student's action lies wholly with the student.

REGULATIONS

Students in the School of Engineering are subject to, and are expected to familiarize themselves with, the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 12-27, and the University regulations stated on pages 44-52.

AMOUNT OF WORK

Eighteen credit hours, including required physical education, constitute normal full time work. Nine credit hours constitute normal part-time work.

A full-time student who is not on probation may take ordinarily not more than nineteen credit hours. A student employed more than twenty-four hours a week, who is not on probation, may take ordinarily not more than ten credit hours. A student whose quality point index is 3.00 or higher may be permitted by the Dean to exceed these limits by not more than two credit hours.

A student previously unemployed who accepts employment subsequent to registration or at any time during a term is required to report that fact immediately to the Dean, in order that adjustments in schedule may be made, if necessary, to bring his program within the Faculty's limitations upon the amount of work to be carried by an employed student.

ATTENDANCE

The student is expected to attend every meeting of the course in which he is registered, fully prepared to carry on the work required. The student is held responsible for all work in the course, and all absences must be excused before provision will be made for him to make up the work missed. Excuses for absences from examinations which have been announced in advance can be obtained only by making written application to the instructor in charge of the course.

CHANGES IN PROGRAM OF STUDIES

In addition to the general University regulations on pages 44-52 the following regulations apply to students in the School of Engineering:

During the seven days following the first day of classes of a term, additional courses may be added to the student's program with the approval of the instructor, the student's adviser, and the Dean.

During the thirty-five days following the first day of classes, courses may be dropped with the approval of the student's adviser and the Dean, and without academic penalty. Withdrawal from a course without the approval of the student's adviser entails a penalty of failure in the course.

Withdrawal from a course, without academic penalty, may be authorized by the Dean at any time upon presentation of written evidence of extenuating circumstances.

THE BACHELOR'S DEGREES

The Bachelor's degrees are Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, and Bachelor of Science in Engineering.

The degree of Bachelor of Science in Engineering may be earned with

any of the following options: Business Administration, Chemistry, Economics, Mathematics, Machine Computer, Physics, or Statistics.

REQUIREMENTS FOR THE DEGREES

SCHOLARSHIP

The system of grading and computing scholarship is described in detail on pages 44 and 45.

In order to graduate, a student must have a quality-point index of at least 2.00 on all work taken at The George Washington University, and in addition, a quality-point index of at least 2.00 on all work accepted for the degree in the School of Engineering.

Probation.—A student must maintain a quality-point index of at least 2.00, or be placed on probation. A student remains on probation as long as his quality-point index is below 2.00, or until his probation is removed by the Committee on Scholarship.

Probation is imposed for the amount of time required to complete a minimum of twelve additional credit hours or for one term, whichever is greater. In certain circumstances the period of probation may be extended. A student on probation may not hold office or participate in the activities of any student organization or represent the School in any undergraduate competition.

Students placed on probation for scholastic deficiency are required to complete diagnostic counseling tests and remedial study as prescribed by the Committee on Scholarship.

Suspension.—A student who has a quality-point index below 1.00 will be suspended. A student who becomes subject to probation for the third time, whether successive or after an interval, will be suspended.

A student suspended for poor scholarship may apply for readmission after an interval of one calendar year. He must then submit evidence to the Dean's Council that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission and, in addition, must complete diagnostic counseling tests and remedial study as prescribed by the Committee on Scholarship. A student suspended twice for poor scholarship will not be readmitted.

The foregoing scholarship regulations are applied when a student has completed a minimum of twelve credit hours of work. Thereafter, the regulations are applied in multiples of twelve credit hours.

USE OF CORRECT ENGLISH

Any student whose use of English in any course whatever is deemed unsatisfactory may be reported by the instructor to the Dean's Council.

The Council may assign supplementary work, without academic credit varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the Dean's Council.

The foregoing regulation applies to both written and spoken English.

RESIDENCE

For the Bachelor's degrees, a minimum of one year or thirty-six credit hours must be completed in residence. Summer term work may be counted in residence, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in residence.

CURRICULUM REQUIREMENTS

The satisfactory completion of one of the following curricula of 140 credit hours, exclusive of physical education, is required.

Physical Education is required of all students in the freshman and sophomore years. (See "Physical Education Requirements", pages 47-48.)

Variations from the prescribed curricula may be made, with the permission of the Dean's Council. A student desiring to omit a required course and substitute another must make written application to the Dean presenting satisfactory reasons for the substitution; and written approval must be obtained before registration for the course.

A student who is absent from the University for one term or more (except on national service leave) is required to satisfy the curriculum requirements existing at the time of his return.

FRESHMAN YEAR (FOR ALL ENGINEERING CURRICULA)

Chem. 11-12
CE 2
Engl. 1, 2
Math. 12
Math. 13
ME 1
ME 3

General Chemistry
Plane Trigonometry
English Composition
Analytic Geometry
Differential Calculus
Engineering Mathematics
Mechanical Drawing

Credit
Hours
8
2
6
3
3
4
2

* Before students are required to English 1, they are tested in the minimum amount of vocabulary, spelling, grammar, standard usage, and sentence skills. Those students who show minimal proficiency must spend twenty-four hours in remedial work before being permitted to register for English 1 with the required Freshman English course. Those who are inadequately prepared for English 1 will be required to English 1A for which credit will be given when it is found to satisfy minimum requirements.

ME 4	Descriptive Geometry	2
Phys. Ed.	See pages 47-48 for statement of requirement	
*Phys. 6 and 7	General Physics	6
Total		34

ROTC—Air Force ROTC students substitute Air Science 1-2 (4) for Mechanical Engineering 1 (1) and Physical Education 1-2 (2).

SOPHOMORE YEAR (FOR ALL ENGINEERING CURRICULA)

		Credit Hours
Phys. 8	General Physics	5
Phys. 55	Physical Measurements	3
Math. 2-3	Integral Calculus	3
Math. 1-2	Calculus and Differential Equations	5
EE 9-10	Elements of Electrical Engineering	6
CE 21	Analytical Mechanics: Statics	2
CE 22	Analytical Mechanics: Dynamics	3
Speech 1	Effective Speaking	3
Eng. 11	The Writing of Reports	3
ME 13-14	Mechanics	4
CE 25-26	Engineering Materials	4
Phys. Ed.	See pages 47-48 for statement of requirement	
Total		37

ROTC—Air Force ROTC students substitute Air Science 51-52 (4) for Physical Education 11-12 (2) and Speech 1 (3).

Bachelor of Civil Engineering

JUNIOR YEAR

		Credit Hours
CE 123	Strength of Materials	3
CE 130	Elementary Fluid Mechanics	3
CE 140	Materials and Hydraulics Laboratory	2
ME 111-112	Thermodynamics	5
Phys. 132	Electronics	3
Eng. 1-2	Principles of Engineering	3
CE 141	Graphic Statics	3
CE 142	Bridge Structures	3
Effective	.....	5
Total		34

ROTC—Air Force ROTC students substitute Air Science 1-2 (4) for Physics (3).

*The student who begins Physics with Physics 6 in 1 is subject to a qualifying examination and he goes for Physics 1 if he meets the entrance requirements.

†Credit is not given for courses earned in Practical Experience or Secretarial Studies.

SENIOR YEAR

		Credit Hours
CE 143	Human Systems	4
CE 154	Industry Engineering	3
CE 147-48	Structural Design	4
CE 149-50	Concrete and Masonry Construction	4
CE 151-52	Structural Laboratory Structures	4
CE 153-54	Water Supply and Sewerage	4
CE 155-56	Highway Construction and Materials	4
CE 157-58	Planning and Civil Engineering	2
CE 159-60	Soil Mechanics	3
CE 161		

Total.....

NOTE—All First ROTC students substitute Art Science 151-52 (6) for Civil Engineering 157-58 (4) and Civil Engineering 159-60 (4).

Bachelor of Electrical Engineering

JUNIOR YEAR

		Credit Hours
CE 143	Strength of Materials	3
CE 155	Introductory Fluid Mechanics	2
CE 140	Materials and Hydraulics Laboratory	6
ME 111-12	Thermodynamics	6
Phys 142	Electricity	3
Phys 1-4	Principles of Electronics	4
EE 105-6	Direct-Current Laboratory	3
EE 107	Alternating-Current Circuit	3
EE 108	Alternating-Current Machinery	3
•Elective		

Total.....

NOTE—All First ROTC students substitute Art Science 1-4 (4) for Electromechanics 1 (4) and Elective (3).

SENIOR YEAR

1. Communications Option

		Credit Hours
EE 111-12	Advanced Network Theory	3
EE 143-44	Advanced Network Laboratory	3
Phys 143	Electronic Circuits	3
EE 145	Applications of Electronic Devices	4
EE 146-47	Electronic Measurements	3
EE 148	Alternating-Current Machinery	2
EE 149	Electronic Device Laboratory	

* Elective credit given for courses elected in Physics, Electronics or Semiconductor Physics.

The School of Engineering

135

EE 133-34	Alternating-Current Laboratory	4
EE 189-92	Principles in Electrical Engineering	2
*Elective	.....	3

Total

ROTC—Air Force ROTC students substitute Air Science 151-52 (6) for Electrical Engineering 189-92 (2) and Elective (3).

		Credit Hours
2 Power Option		
EE 129	Alternating-Current Machinery	3
EE 140	Electronic Design	3
EE 130	Insulation Engineering	2
EE 138	Industrial Electrical Power Applications	2
EE 120	Symmetrical Components	3
EE 133	Principles of Electric Power Transmission	3
EE 111-12	Electrical Measurements	4
EE 133-34	Alternating-Current Laboratory	4
EE 189-92	Principles in Electrical Engineering	2
Phys 133	Electronic Circuits	3
*Elective	.....	5

Total

ROTC—Air Force ROTC students substitute Air Science 151-52 (6) for Elective (5).

Bachelor of Mechanical Engineering

JUNIOR YEAR

		Credit Hours
CE 123	Strength of Materials	3
CE 130	Elementary Fluid Mechanics	3
CE 140	Materials and Hydraulics Laboratory	2
ME 111-12	Thermodynamics	6
Phys 132	Physics	3
Chem 1-2	Principles of Chemistry	6
ME 141-42	Management Principles	4
ME 7	Machine Drawing	2
ME 8	Mechanical Drawing	2
*Elective	.....	5

Total

ROTC—Air Force ROTC students substitute Air Science 151-52 (6) for Elective (5).

SENIOR YEAR

		Credit Hours
ME 120-30	Power Plants	6
ME 127-28	Machine Design	4

* Units are not given for courses elected in Physical Education or Secretarial Studies.

The College, Schools, and Divisions

ME 100	Fluid Dynamics	3
ME 101	Dynamics of Machinery	3
ME 102-103	Heating, Ventilating, Air Conditioning, and Refrigeration	4
ME 104	Methods of Manufacture	3
ME 105	Combustion Engines	4
ME 106-107	Mechanical Laboratory	20
ME 108-109	Seminar in Mechanical Engineering	4
* Elective		14
Total		64

ROTC—Air Force ROTC students substitute Air Science 151-152 (6) for Mechanical Engineering 187-188 (2) and Elective (4).

Bachelor of Science in Engineering

JUNIOR YEAR

CE 123	Strength of Materials	3
CE 124	Elementary Fluid Mechanics	3
CE 125	Materials and Hydraulics Laboratory	6
ME 111-112	Thermodynamics	3
Phys. 132	Electronics	6
Econ. 1-2	Principles of Economics	4
ME 141-142	Management Problems	4
CE 187-188	Engineering Contracts and Specifications	5
* Elective		20
Total		64

ROTC—Air Force ROTC students substitute Air Science 151-152 (6) for Mechanical Engineering 187-188 (5).

SENIOR YEAR

Option	As approved by the department concerned	34
Total		64

ROTC—Air Force ROTC students substitute Air Science 151-152 (6) for Mechanical Engineering 187-188 (5) as approved by the department concerned.

The Bachelor of Science in Engineering curriculum provides training in the basic physical principles employed in engineering and in engineering methods of analysis, and in addition, offers an opportunity for study in optional fields in which the student has special interest.

Optional study can be selected from the fields of Business Administration

* Credit is not given for courses listed in Physical Education or Secretarial Studies.

tion, Chemistry, Economics, Machine Computer, Mathematics, Physics, or Statistics. The program of study in the option is formulated by the department concerned in conference with the student. The program, bearing the approval of the department concerned, must be submitted by the student to the Dean's Council for approval before the beginning of the senior year. During the period of optional study the student must comply with such regulations as the department concerned may prescribe.

The following curricula are recommended, for the guidance of students, by the several departments in which optional study is available. Variations from these curricula to satisfy the exceptional needs of individual students may be made by the department concerned.

BACHELOR OF SCIENCE IN ENGINEERING OPTIONAL CURRICULA

		Credit Hours
Business Administration Option		
Acct. 102	Introductory Accounting	4
Bus. Adm. 101	Business Organization and Combination	4
Bus. Adm. 101	Business Finance	4
Pol. Sc. 127	Commercial Law—Contracts, Sales, Agency, and Bailments	4
Liberal Arts Option		
Four credit hours to be selected from the following:		
Acct. 101	Cost Accounting	4
Acct. 111	Financial Statement Analysis	4
Acct. 103	Business Bookkeeping	4
Bus. Adm. 105	Personnel Management in Industry	4
Bus. Adm. 106	Principles in Personnel Management	4
Bus. Adm. 109	Office Management	4
Bus. Adm. 121	General Insurance	4
Bus. Adm. 141	Principles of Marketing	4
Bus. Adm. 145	Sales Management	4
Bus. Adm. 150	Principles of Purchasing	4
Econ. 121	Money and Banking	4
Econ. 171	Economics of Public Utilities	4
Econ. 172	Economics of Transportation	4
Stat. 111	Business and Economic Statistics	4
Chemistry Option		
Chem. 21	Qualitative Inorganic Analysis	4
Chem. 22	Quantitative Inorganic Analysis I	4
Chem. 111-112	Physical Chemistry Lectures	6
Chem. 113-114	Physical Chemistry Laboratory	4
Chem. 122	Quantitative Inorganic Analysis II	4
Chem. 135	Inorganic Chemistry, Preparations	4
or 155	Organic Chemistry, Preparations	2
Chem. 151-152	Organic Chemistry	8
Elective	Two years of German recommended	12
Physics Option		
Phys. 101-2	Physics Analysis	4

Econ. 105	Business Cycles	3
Econ. 121	Money and Banking	3
Econ. 141-42	Labor Economics	6
Stat. 101	Business and Economic Statistics I	3
Stat. 112	Business and Economic Statistics II	3
Elective	Six credit hours in Economics, Statistics, or Business Administration, allowed with the approval of the Department of Economics.	3

Machine Computer Option

(Junior Year)

ME 111-12	Thermodynamics	6
CE 123	Strength of Materials	3
CE 130	Intermediate Fluid Mechanics	3
EE 107	Alternating Current Circuits	3
Phys. 112	Electromagnetism	3
Stat. 157-58	Mathematical Statistics	3
Math. 412	Mathematics for Engineers and Scientists	3
Math. 205	Modern Algebra	6
•Elective		0

(Senior Year)

ME 141-42	Management Principles	6
Phys. 113	Electricity, Optics	3
EE 115	Advanced Network Theory I	3
EE 121	Advanced Network Laboratory	2
EE 145	Applications of Electronic Theory I	3
EE 150	Electronic Device Laboratory	2
EE 171	Modern Computing Machines	3
EE 172	Modern Computing Concepts	3
Math. 120	Advanced Analytic Geometry	6
Math. 143-44	Numerical Analysis	2
•Elective		0

Mathematics Option

Three credit hours of mathematics beyond calculus, in second and third years.

Physics Option

Math. 112	Differential Equations	3
Phys. 106	Optics	3
Phys. 113-14	Atomic and Statistical Physics	3
Phys. 132	Intermediate	3
Phys. 145	Advanced Physical Measurements	3

Statistics Option

Stat. 91-92	Principles of Statistical Methods	6
Stat. 117	Analysis of Variance	3
Stat. 118	Correlation and the Chi-Square Test	3
Stat. 155-56	Mathematical Probability	6
Stat. 157-58	Mathematical Statistics	6

*Credit is not given for courses elected in Physical Education or Secretarial Studies.

GRADUATE RECORD EXAMINATIONS

During the final term of the senior year students in the School of Engineering are required to take the following Graduate Record Examination: the Attitude Test, which provides a measure of general scholastic ability at the graduate level; and the Advanced Test, designed to measure the achievement of the college senior in his major field of study. (For further information concerning the Graduate Record Examinations, see page 40.)

THE MASTER'S DEGREES

The Master's degrees are Master of Science in Engineering and Master of Engineering Administration.

THE DEGREE OF MASTER OF SCIENCE IN ENGINEERING

Upon the satisfactory completion of the requirements of the School of Engineering the degree of Master of Science in Engineering is conferred. The discipline of this degree is designed to lead to a mastery of scientific principles and methods as they are applied in engineering. It is conceived that this objective can be served best by providing a relationship in which the intellectual needs and desires of the student are an important element in determining the curriculum. To this end the responsibility for the student's program of study is established in a Committee on Graduate Studies composed of members of the University Faculty and specialists selected from the engineering profession. Programs of study are prescribed for each candidate by the Committee on Graduate Studies or an assigned adviser, in accordance with his state of knowledge and needs, and as required to achieve the objective of mastery of principles and methods. These programs are not curricula common to all candidates for the degree. They may consist of formal courses, independent study, or individual study under assigned faculty, and may include work in several departments and fields of study.

ADMISSION TO CANDIDACY

Application for admission to candidacy for the degree must be submitted to the Office of the Director of Admissions on the form prescribed by that Office. Applicants will be advised by the Committee on Graduate Studies of the time and place of the required personal interview.

Applicants are required to satisfy the Committee of their capacity for productive study in the discipline and must have acceptable personal qualities. Applicants with Bachelor's degrees from recognized institutions and with records which, in the opinion of the Committee on Grad-

Graduate Studies give evidence of adequate preparation for graduate study may be admitted to candidacy for a graduate degree. Applicants who do not hold a satisfactory Bachelor's degree in engineering, or whose adequacy of preparation is questioned may be admitted to candidacy upon successful completion of a qualifying examination prescribed by the Committee.

ADVANCED STANDING

Graduate study completed prior to admission to candidacy for the graduate degree in the School of Engineering will be considered by the Committee on Graduate Studies in prescribing the candidate's program of study provided it contributes substantially to the achievement of mastery of principles and methods. In any case a minimum of one year full-time study must be completed under the Committee on Graduate Studies.

REQUIREMENTS FOR THE DEGREE

The candidate for the degree must complete a minimum of one year of full-time study, or the equivalent in part-time study, under the guidance of the Committee on Graduate Studies; complete the program prescribed by that committee, including course examinations; and demonstrate, by passing a comprehensive examination, substantial mastery of scientific principles and methods of their use in the area of his interest. This examination may be written, oral, or both, at the discretion of the Committee.

Candidates with limited areas of unsatisfactory preparation may be required to complete additional necessary remedial or preparatory study.

All of the work applied toward this degree must be accomplished under the guidance of the Committee on Graduate Studies.

Course work applied to satisfy requirements for another degree may not be applied to satisfy requirements for the graduate degree in engineering.

With the approval of the Committee on Graduate Studies the candidate may include a thesis in his program. He will be subject to an oral examination on his thesis.

The candidate's scholarship must be satisfactory to the Committee, and will commonly be required to be equivalent to the grade of *B*. A student whose work is unsatisfactory will be suspended by the Dean, upon the recommendation of the Committee on Graduate Studies or the student's assigned adviser.

The candidate must complete the requirements for the degree within three years, if he is a full-time student; within five years, if he is a part-time student.

THE DEGREE OF MASTER OF ENGINEERING ADMINISTRATION

Upon the satisfactory completion of the requirements of the School of Engineering the degree of Master of Engineering Administration is conferred. The purpose of this program is to offer, through academic study at graduate level, a means of improving the management and administrative ability of government and industrial engineers and scientists.

The objective of this graduate discipline is to develop a mastery of management principles and practices as they apply in the administration of engineering and scientific activities. Knowledge and understanding are sought rather than breadth or familiarity with techniques.

Study programs are prescribed for each candidate, in accordance with his preparation and objective, by the Committee on Graduate Studies. These programs are not curricula common to all candidates for the degree. They may consist of formal courses, independent study, or individual study under assigned faculty, and move freely among departments and fields of study. Each candidate is under the personal guidance of a selected faculty member.

ADMISSION TO CANDIDACY

Applications for admission to candidacy for the degree must be submitted to the Office of the Director of Admissions on the form prescribed by that Office. Applicants will be advised by the Committee on Graduate Studies of the time and place of the required personal interview.

Applicants are required to satisfy the Committee of their capacity for productive study in the discipline; must have acceptable personal qualities; must hold a Bachelor's degree in engineering or science from a recognized institution; must have had some supervisory or administrative experience; and give evidence of preparation, which in the opinion completed under the Committee on Graduate Studies.

Applicants who lack a satisfactory Bachelor's degree or whose adequacy or preparation is questioned may be admitted to candidacy upon passing qualifying examinations prescribed by the Committee. Applicants lacking satisfactory supervisory or administrative experience may, under certain circumstances, be considered by the Committee.

ADVANCED STANDING

Graduate study completed prior to admission to candidacy for the degree will be considered in prescribing the program of study, provided it contributes substantially to the achievement of the objective of the discipline. In any case a minimum of one year full time study must be completed under the Committee on Graduate Studies.

Study applied to satisfy the requirements for another degree may not be applied toward the degree of Master of Engineering Administration.

REQUIREMENTS FOR THE DEGREE

The candidate for the degree of Master of Engineering Administration must successfully complete a minimum of one year full-time study, or the equivalent in part-time study, as prescribed by the Committee on Graduate Studies, including course examinations, pass a comprehensive examination on his area of study; and solve a comprehensive problem in engineering administration. At the discretion of the Committee the examination may be written, oral, or both. Candidates with limited areas of unsatisfactory preparation may be required to complete necessary remedial study in addition to their graduate programs.

The candidate's scholarship must be satisfactory to the Committee, and will commonly be required to be equivalent to the grade of B. A student whose work is unsatisfactory will be suspended by the Dean upon the recommendation of the Committee or the advisor.

The problem which each candidate is required to solve may be proposed by the student, but it must be approved by the Committee. Its purpose is to demonstrate the candidate's ability to integrate his studies in the solution of a typical administrative problem of a comprehensive nature, requiring for its solution knowledge of a variety of principles and procedures. The candidate is subject to an oral examination on his problem at the discretion of the Committee.

The work for the degree, including the comprehensive examination, must be completed within three years by a full time student, or within five years by a part time student.

THE PROFESSIONAL DEGREES

The professional degree of Civil Engineer, Electrical Engineer, or Mechanical Engineer may be conferred upon a graduate of the School of Engineering who has demonstrated his professional ability.

REQUIREMENTS FOR THE DEGREE

1. Application may not be made sooner than three years after graduation, and then only if the candidate has had definite responsibility for engineering work of substantial importance.
2. A detailed statement of the candidate's experience, references, the degree sought, and the title of the dissertation must be filed with the Dean eight months before the Commencement at which the degree is to be conferred.

Detailed information concerning the preparation of the dissertation may be obtained from the Office of the Dean.

3. The dissertation will be read for acceptance by an examining committee appointed by the Dean to include members of the Faculty of the School of Engineering and at least one expert from engineering practice. The committee will report its recommendation to the Faculty of the School of Engineering.

THE SCHOOL OF PHARMACY

THE FACULTY AND STAFF OF INSTRUCTION •

Charles Watson Bliven, M.S., *Dean of the School of Pharmacy*

Ralph Dale Kennedy, Ph.D., *Professor of Accounting*
Ira Bowers Hansen, Ph.D., *Professor of Zoology*
‡Lawson Edwin Yocum, Ph.D., *Professor of Botany*
Charles Watson Bliven, M.S., *Professor of Pharmacy*
Alan Thomas Deibert, A.M., *Professor of Romance Languages*
Chester Elwood Leese, Ph.D., *Professor of Physiology*
Calvin Darlington Linton, Ph.D., *Professor of English Literature*
Carleton Raymond Treadwell, Ph.D., *Professor of Biochemistry*
George Martin Koehl, A.M., *Professor of Physics*
Robert Corbin Vincent, Ph.D., *Associate Professor of Chemistry*
Mary Louise Robbins, Ph.D., *Associate Professor of Bacteriology*
Salvatore Joseph Greco, Ph.D., *Associate Professor of Pharmacy*
Robert Meyer Leonard, Ph.D., *Associate Professor of Pharmacology and
Pharmacology*
Willis Eugene Moore, Ph.D., *Assistant Professor of Pharmaceutical
Chemistry*
Harold Jerome Bobys, A.B., C.P.A., *Lecturer on Pharmacy Accounting*
Carson Gray Frailey, A.B., LL.B., *Lecturer on Pharmaceutical Law*
Richard Donald Early, A.M., *Lecturer on Pharmacy Management*
Franklin Dero Cooper, M.S., *Instructor in Hospital Pharmacy*

SPECIAL LECTURERS

William Paul Briggs, M.S., Sc.D., LL.D., *Executive Director and Secretary, American Foundation for Pharmaceutical Education; Pharmacy Training*
Frederick John Cullen, Phar.G., M.D., *Executive Vice-President, The Proprietary Association; Drug Manufacture*
John Christian Krantz, Jr., Ph.D., *Professor of Pharmacology, University of Maryland; Pharmaceutical Research*

• The President of the University, the Dean of Faculty of the University, the Dean of the School of Pharmacy, the Registrar of the University, the Director of Admissions at the University, Professors, Associate Professors, Assistant Professors, and Instructors participate in the Faculty.

‡ On leave of absence spring term 1945-46.

Justin Lawrence Powers, Ph.D., *Chairman, Committee on National Formulary, American Pharmaceutical Association; Official Drug Standards*

Robert Philip Fischelis, B.S., Phar.D., Sc.D., *Secretary and General Manager, American Pharmaceutical Association; Pharmaceutical Organizations*

Daniel Lamont Seckinger, M.D., Dr.P.H., *Director of Public Health, District of Columbia; Hygiene and Sanitation*

PGad Bryan Morehouse, A.B., LL.B., LL.M., *Assistant General Counsel in Charge of Compliance, Federal Trade Commission; Drug Trade Regulation*

Louis Edward Kazin, Ph.G., *Associate Editor, Drug Topics; Contemporary Pharmacy*

Nevis Eugene Cook, B.S., in Phar., *Assistant to the Commissioner of the Food and Drug Administration; Drug Control*

Karl Bambach, Ph.D., *Executive Vice-President, American Drug Manufacturers Association; Pharmaceutical Industry*

COMMITTEES •

THE DEAN'S COUNCIL ‡

Ralph Dale Kennedy

Ira Bowers Hansen

Salvatore Joseph Greco

COMMITTEE ON SCHOLARSHIP

Lawson Edwin Yocum, *Chairman*

Robert Meyer Leonard

Robert Corbin Vincent

ADVISORY COMMITTEE

Irving Alexander Tennyson, *Chairman*

Howard Bradbury

William Paul Briggs

Fred Royce Franzoni

GENERAL INFORMATION

INTRODUCTORY

In 1867 the foundation for the National College of Pharmacy was laid by the Apothecaries' Association of the District of Columbia. The college was opened in 1872 and continued until 1906, when it became affiliated with The George Washington University.

* The President of the University and the Dean of the School of Pharmacy are members ex officio of all committees.

‡ Elected by the Faculty

The School of Pharmacy is accredited by the American Council on Pharmaceutical Education as a class "A" school. It is a member of the American Association of Colleges of Pharmacy.

Washington offers many opportunities for the student of pharmacy. The American Institute of Pharmacy, the headquarters of the American Pharmaceutical Association, is only a few blocks from the School of Pharmacy. The Institute also houses a pharmaceutical museum, a library, and research laboratories. Government agencies and laboratories whose activities are closely allied to pharmacy, and the government libraries, the facilities of which are open to the student, are readily accessible.

The Institute and the Federal Government bring to Washington leaders in the fields of pharmacy, many of whom present to senior students in the School of Pharmacy current professional information.

The objectives of the School of Pharmacy are (1) to train professionally competent pharmacists, primarily for retail practice, and to help them acquire specialized training, a general education, and an attitude of responsibility to their profession and to society; (2) to promote the health profession of pharmacy in general, and particularly within the community.

To achieve these objectives the School has developed a systematic plan of instruction for the professional courses which is integrated with the liberal arts program. It further encourages student participation in university, professional, and civic organizations and activities which increase professional competence, raise professional standards, and help develop social responsibility.

REGULATIONS

Students in the School of Pharmacy are subject to and are expected to familiarize themselves with the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES as stated on pages 12-27, and the University regulations stated on pages 44-52.

Students registered in the Junior College Pharmacy curriculum are subject to the regulations of the Junior College. However, in the professional courses of that curriculum, the attendance requirements of the School of Pharmacy prevail.

AMOUNT OF WORK

Normal work for any year is that outlined under the head of "Curriculum Requirements", below. A student who wishes to take more than the normal amount of work may do so only with the permission of the Committee on Scholarship, the members of which are guided in their decision by the scholastic record and the extent to which he is employed. A student on probation is limited in the number of credit hours he may carry.

The student is not encouraged to undertake outside employment while attempting a full course of study. A student who maintains a quality-point index of 2.00 or higher for all courses and a quality-point index of 2.50 or higher for pharmacy courses may be granted permission by the Dean to undertake outside employment. The amount of the employment permitted is governed by the scholarship record of the student and the number of credit hours for which he is registered.

A student previously unemployed who accepts employment subsequent to registration or at any time during a term is required to report that fact immediately to the Dean.

ATTENDANCE

Except by special permission of the instructor, credit will not be given for any pharmacy course if absences, including both lecture and laboratory, exceed in number for each term the hours of credit for the term. If a course has distinct divisions such as lectures, laboratories, or recitations, the absences apply pro rata to such divisions.

EXAMINATIONS BEFORE STATE BOARDS OF PHARMACY

To be eligible for examination before state boards of pharmacy, the applicant is required to present satisfactory evidence of graduation from a college of pharmacy. In addition, most states require that the applicant have one year of practical experience in a pharmacy. This experience may not be gained concurrently with the school year.

THE DEGREE OF BACHELOR OF SCIENCE IN PHARMACY

Upon the satisfactory completion of the requirements of the School of Pharmacy, the degree of Bachelor of Science in Pharmacy is conferred.

REQUIREMENTS FOR THE DEGREE

SCHOLARSHIP

The system of grading and of computing scholarship is described in detail on pages 44 and 45.

In order to graduate, a student must have a general quality-point index of at least 2.00. In addition, he must have a quality-point index of at least 2.50 in all pharmacy courses.

Probation.—A student must maintain a general quality point index of at least 2.00, or be placed on probation.

A student remains on probation as long as his general quality-point index is below 2.00; however, a student who has an index of between

1.50 and 2.00; however, a student who has an index of between 1.50 and 2.00 may retain him on probation or suspend him.

Suspension.—A student who has a general quality-point index below 1.50 will be suspended; however, a student who has an index between 1.40 and 1.50 will be considered by the Committee on Scholarship, which may retain him on probation or suspend him.

A student who is subject to probation for the third time, whether successive or after an interval, will be suspended.

A student suspended for poor scholarship may apply for readmission after an interval of a calendar year. He must then submit evidence to the Dean of the School of Pharmacy that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student suspended twice for poor scholarship will not be readmitted.

The foregoing scholarship rules are applied when a student has undertaken a multiple of nine credit hours.

CURRICULUM

The Junior College Pharmacy curriculum (see page 65) comprises the first two years of the four-year pharmacy course. The curriculum is established by the faculties of the School of Pharmacy and the Junior College in accordance with the professional needs, and complies, in so far as possible, with the latter group regarding the general cultural studies.

The laboratory method of teaching is used. Recitation classes are held in connection with each course in order to provide systematic drill in the subjects.

The curriculum requirements include at least 137 credit hours. The following curriculum leads to the degree of Bachelor of Science in Pharmacy.

Freshman and Sophomore Years

Courses	Dist. hrs.	Lab. hrs.	Credit hrs.	Clock hrs.
Courses in the Junior College (see page 65)	880	650	60	1530

Junior Year: Fall Term

Courses	Did. hrs.	Lab. hrs.	Credit hrs.	Clock hrs.
Chemistry 21.....	32	96	4	128
Pharmacy 101.....	32	48	3	80
Pharmacy 105.....	32	....	2	32
Pharmacy 107.....	48	....	3	48
Physiology 115.....	48	....	3	48
Physiology 117.....	....	48	1	48
Total.....	192	192	16	354

Junior Year: Spring Term

Bacteriology 112.....	48	96	4	144
Chemistry 152.....	32	96	4	128
Pharmacy 102.....	32	96	4	128
Pharmacy 106.....	32	....	2	32
Pharmacy 110.....	48	....	3	48
Total.....	192	288	17	480

Senior Year: Fall Term

*Biochemistry 221.....	32	96	4	128
Pharmacy 104.....	48	96	4	128
Pharmacy 111.....	16	48	3	80
Pharmacy 105.....	32	....	3	48
Exercise.....	32	96	3	112
Total.....	160	336	17	496

* Students planning to do graduate work may request the substitution of other courses for Biochemistry 221-22 if these courses will be included in the graduate curriculum.

Senior Year: Spring Term

Bacteriology 210.....	32	.....	2	32
• Biochemistry 222.....	32	96	4	128
Pharmacy 106.....	32	64	3	96
Pharmacy 176.....	32	.....	2	32
Pharmacy 178.....	64	.....	4	64
Pharmacy 188.....	48	.....	1	48
Pharmacy 189.....	16	.....	1	16
Pharmacy 192.....	.....	48	1	48
Total.....	256	208	18	474
Grand total.....	1680	1680	137	1760

THE DEGREE OF MASTER OF SCIENCE IN PHARMACY

Upon the satisfactory completion of the graduate requirements of the School of Pharmacy, the degree of Master of Science in Pharmacy is conferred.

DEFINITION OF THE MASTER'S WORK

The study leading to the degree of Master of Science in Pharmacy is a comprehensive survey of one or more of the fields of knowledge embraced by Pharmacy. It is a continuation of the work of the student's undergraduate major and involves a greater acquaintance with scholarly method.

The student must satisfy certain minimum requirements as to previous preparation, residence, ability to read an approved modern foreign (European) language, and courses taken; but these requirements, while essential, are regarded primarily as qualifying measures. The student's knowledge of his field, as demonstrated by his thesis and by the results of his Master's examination (together with such other examinations involving special skills or techniques as may be required), is the basis upon which the Master's degree is conferred. The foreign language requirement may be waived by faculty action in the instance of students whose field of study at the Master's level may not require such preparation.

REQUIREMENTS FOR THE DEGREE

RESIDENCE

An academic year of residence is required, i.e., completion of a minimum of thirty credit hours of work including the thesis, which is

* Students planning to do graduate work may request the substitution of other courses for Pharmacy 222 if these courses will be included in the graduate curriculum.

counted as the equivalent of six credit hours of course work. Summer term work may be counted in residence, but in no case may the period of residence aggregate less than twenty-seven weeks. Not more than twelve credit hours (which must be approved in advance by the Dean of the School of Pharmacy) may be taken in another school or division of this University, and such work may not be counted toward both a degree in that school or division and the Master's degree in the School of Pharmacy.

AMOUNT OF WORK

A student whose previous preparation in his chosen field has been adequate may complete his requirements, including the thesis, by a minimum of thirty credit hours; others are required to do additional work. First-group courses may not be credited toward the Master's degree. Pharmacy courses numbered below 200 may be credited toward the Master's degree only when registration for graduate credit has been approved at the beginning of the course by the instructor and the Dean of the School of Pharmacy.

ADMISSION TO CANDIDACY

In addition to admission requirements stated on page 19, the applicant for admission to candidacy for the Master's degree must be approved by the appropriate representative of the Department of Pharmacy and by the Dean.

SCHOLARSHIP

A student whose scholarship is considered unsatisfactory may be suspended by the Dean upon recommendation of the staff member under whom the student is working.

THE MASTER'S THESIS

The thesis may be of a research, expository, critical, or creative type. The main purpose of a Master's thesis is to demonstrate the student's ability to make independent use of the information and training acquired through his other disciplines, and to furnish objective evidence of his constructive powers in his chosen field. Registration for the thesis must be no later than the beginning of the final year of preparation, unless the professor in charge of the thesis permits registration at the beginning of the final term. The choice of the thesis subject must be approved by the professor in charge of the student's field and recorded in the Office of the Registrar by the date announced in the University calendar. Registration for the thesis is ordinarily made on the basis of three credit hours for two successive terms. In exceptional cases, and with the

approval of the professor in charge of the thesis, the student may register for the entire six credit hours during a single term. The type-written thesis in its final form must have the approval of the professor in charge of the student's field and must be presented to the Dean by the student not later than the date announced in the University calendar. Requirements regarding the form of the thesis are stated on pages 49-50, and additional information will be supplied by the Dean.

Payment of tuition for the thesis entitles the candidate, during the academic year of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year may be granted without further tuition payment. If the preparation of the thesis extends beyond the two-year period the student must register for it again, and pay tuition on the same basis as for a repeated course.

FINAL EXAMINATION

In addition to the course examinations, the candidate must pass a final examination on the thesis and its related fields. This examination may be either written or oral at the discretion of the Faculty.

If the thesis is submitted more than three years after the course requirements have been completed, a written examination covering the student's complete program of study will also be required.

THE SCHOOL OF EDUCATION

THE FACULTY AND STAFF OF INSTRUCTION •

James Harold Fox, A.M., Ed.D., *Dean of the School of Education*
Ralph Windsor Ruffner, A.M., Ed.D., *Assistant Dean of the School of Education*

Henry Grattan Doyle, A.M., LL.D., Litt.D., *Professor of Romance Languages*

Ruth Harriet Atwell, Ph.B., A.M. in Ed., *Professor of Physical Education for Women*

Frank Mark Weida, Ph.D., *Professor of Statistics*

Mitchell Dreese, Ph.D., *Professor of Educational Psychology*

James Harold Fox, A.M., Ed.D., *Professor of Education*

Thelma Hunt, Ph.D., M.D., *Professor of Psychology*

Frances Kirkpatrick, A.M., *Professor of Home Economics*

Louis Clark Keating, Ph.D., *Professor of Romance Languages*

William Henry Myers, A.M., *Professor of Physical Education for Men*

Burnice Herman Jarman, A.M., Ed.D., *Professor of Education*

Chester Elwood Leese, Ph.D., *Professor of Physiology*

Helen Bennett Lawrence, A.M., *Professor of Physical Education for Women*

Blake Smith Root, A.M., Ed.D., *Professor of Education*

Ralph Windsor Ruffner, A.M., Ed.D., *Professor of Education*

Joseph Henry Krupa, M.S., Ed.D., *Professor of Physical Education for Men*

Calvin Weir Pettit, Ph.D., *Professor of Speech*

Meredith Chester Wilson, B.S., *Adjunct Professor of Education*

Charles Edward Bish, A.M., Ed.D., *Professorial Lecturer in Education*

John Frederick Brougher, A.M., Ed.D., *Professorial Lecturer in Education*

Milo Frederick Christiansen, B.S., M.R., *Professorial Lecturer in Physical Education*

Madaline Kinter Remmlein, Ph.D., J.D., *Professorial Lecturer in Education*

Joseph Bueol Johnson, A.M., Ed.D., *Professorial Lecturer in Education*

Kathryn Mildred Towne, A.M., *Associate Professor of Home Economics*

Elizabeth Burton, A.M., *Associate Professor of Physical Education for Women*

Don Carlos Faith, Ph.D., *Associate Professor of Educational Psychology*

* The President of the University, the Dean of Faculties of the University, the Dean of the School of Education, the Registrar of the University, the Director of Admissions of the University, Professors, Associate Professors, Assistant Professors, and Instructors constitute the Faculty of the University.

Raymond George Hanken, B.S. in P.E., A.M. in Ed., *Associate Professor of Physical Education for Men*

Mildred Hollander Shott, A.M., *Associate Professor of Secretarial Studies*

Anthony Charles LaBue, B.S., Ed.D., *Associate Professor of Education*

Vincent James DeAngelis, B.S. in P.E., A.M. in Ed., *Assistant Professor of Physical Education for Men*

Mary Ellen Coleman, A.M., *Assistant Professor of Education: Director of the Reading Clinic*

LaVerne Crabtree Walker, A.M., *Lecturer in Education*

Florence Mary Lumsden, A.M., Ed.D., *Lecturer in Education*

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Raymond Ray Reed, A.M., *Lecturer in Education*

Eugenia Campbell Newlin, A.M., *Lecturer in Education*

Glover LaMarr Angel, A.M., Ed.D., *Lecturer in Education*

Loretta May Stallings, A.M., *Instructor in Physical Education for Women*

Camille Jacob Craig, B.S. in P.E., A.M. in Ed., *Associate in Physical Education for Women*

CONSULTANTS IN RESEARCH

Wesley Earl Armstrong, M.S., Ed.D., *Chief for Teacher Education, U.S. Office of Education*

Johanna Robert Livingston, Ph.D., *Specialist in Industrial Arts, U.S. Office of Education*

Frank James Brown, Ph.D., *Staff Associate, American Council on Education*

FIELD SERVICE COORDINATORS

Helen King Finlay, A.M., *Supervisor of Secondary Education, Arlington, Virginia*

Mary Foust Maré, A.M., *Assistant Principal and Dean of Girls, Wakefield Junior-Senior High School, Arlington, Virginia*

Alexander Anderson, A.M., *Assistant Principal, Washington-Lee High School, Arlington, Virginia*

COMMITTEES*

THE DEAN'S COUNCIL†

1956

Frank Mark Weida

Burnice Herman Jarman

1957

Don Carlos Faith

Joseph Henry Krupa

1958

Helen Bennett Lawrence
Kathryn Mildred Towne

* The President of the University and the Dean of the School of Education are members of all of the committees.
† Elected by the Faculty.

COMMITTEE ON GRADUATE STUDIES

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Mitchell Dreese
Burnice Herman Jarman
Blake Smith Root
Anthony Charles LaBue

Thelma Hunt
Don Carlos Faith
Ralph Windsor Ruffner
Grover LaMarr Angel

COMMITTEE ON ADMISSION AND ADVANCED STANDING

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Harold Griffith Sutton
Burnice Herman Jarman

Frank Mark Weida
Frances Kirkpatrick
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COMMITTEE ON SCHOLARSHIP

Blake Smith Root, *Chairman*

Helen Bennett Lawrence

Kathryn Mildred Towne

Vincent James DeAngelis

GENERAL INFORMATION

INTRODUCTORY

It is the purpose of the School of Education to prepare teachers, supervisors, and administrators for the higher ranges of educational service and to offer opportunities to teachers of experience to extend their education. The School includes the departments of Education, Physical Education, and Home Economics. It offers both graduate and undergraduate work. Other departments of the University provide general education and subject-matter courses needed for a well balanced program of teacher education.

The schedule of courses is arranged to meet the convenience of both full-time and part-time students. By attending evening, Saturday, and summer classes, teachers in the schools of Washington and vicinity may complete all the requirements for a degree without giving up their positions.

REGULATIONS

Students in the School of Education are subject to, and are expected to familiarize themselves with, the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 12-27, and the University regulations stated on pages 44-52.

AMOUNT OF WORK

A normal program of work for an undergraduate student is fifteen credit hours. A student with a quality-point index of 3.00 or higher may, with the Dean's permission, take eighteen hours. More than eighteen hours may not be taken except by special permission of the Committee on Scholarship.

For an employed student six or seven credit hours constitute a normal program. A student with a quality-point index of 3.00 or higher for the preceding term may be permitted by the Dean to take nine or ten credit hours.

For a graduate student fifteen or sixteen credit hours constitute a normal program. For an employed student six or seven credit hours constitute a normal program. If scholarship is sufficiently high, or the nature of employment unusual, the Dean may permit registration for additional credit hours.

A student carrying a full-time program may not be employed part-time for more than fifteen hours a week without permission of the Dean.

THE BACHELOR'S DEGREES

Upon the satisfactory completion of the undergraduate requirements of the School of Education, the degree of Bachelor of Arts in Education, Bachelor of Science in Home Economics, or Bachelor of Science in Physical Education is conferred.

The program of work of each student must be approved by a Faculty adviser. Since each student's program of work will be defined by his particular needs, it is important that the student have a clear conception of his major interest in education, and also that he be familiar with the teaching-certificate requirements in the locality in which he expects to teach.

REQUIREMENTS FOR THE DEGREES

To be recommended for a degree a student must satisfy the admission, residence, scholarship, and curriculum requirements.

RESIDENCE

Candidates for the Bachelor's degrees must complete satisfactorily at this University a minimum of thirty credit hours, nine of which, with the approval of the adviser, may be in the College of General Studies off-campus courses.

For full details concerning continuous registration, see page 49.

SCHOLARSHIP

The system of grading and of computing scholarship is described in detail on pages 44 and 45.

In order to graduate, a student must have a quality point index of at least 2.00.

Probation.—An undergraduate student who fails to maintain a quality-point index of at least 2.00 will be placed on probation. A student remains on probation as long as his quality-point index is below 2.00, or until his probation is removed by the Committee on Scholarship.

Suspension.—An undergraduate student who fails to pass in half or more than half of his work, based on a minimum of sixteen credit hours, will be suspended.

A student who has been suspended for poor scholarship may within ten days appeal his case to the Committee on Scholarship through the Dean. If the case appears to be remediable and the student appears likely to improve in his scholarship thereafter, the Committee may readmit him on probation. A student who has been denied readmission on probation may petition the Committee on Scholarship through the Dean for readmission after the lapse of a calendar year. A student who has been suspended twice will not be readmitted.

CURRICULUM REQUIREMENTS

In any of the following curricula at least thirty credit hours must consist of courses numbered above 100.

Bachelor of Arts in Education

Programs leading to the degree of Bachelor of Arts in Education have four main objectives: (1) provision of general educational backgrounds, (2) a functional command of ideas, concepts, knowledges, and skills in one or more teaching fields, (3) a mastery of basic professional information and skills adequate for a beginning teacher, and (4) development of attitudes needed for success in teaching. Since the contents of teaching fields differ in scope and complexity, some programs are longer than others in terms of credit hours. None require less than 120 credit hours of satisfactory work, exclusive of required Physical Education.

The general educational backgrounds needed by prospective teachers are obtained through: (1) pre-college education, (2) college courses, (3) work experience, (4) leadership activities, (5) participation in student campus activities, and (6) utilization of off-campus cultural opportunities.

Normally, 60 credit hours of the total requirement are completed in

the Junior College of the University or in an equivalent institution elsewhere. (See "Education", pages 65-66.)

Teaching-field requirements include satisfactory completion of prescribed academic courses in one or more fields, a satisfactory score on the special field examination of the National Teacher Examinations, and satisfactory completion of the prescribed special methods courses. Programs of study are available in the following fields: art, biology, business education, chemistry, elementary education, English, French, geography, German, history, mathematics, physics, social studies, Spanish, and speech.

Those preparing to teach on the secondary level are required to complete the prescribed courses in a minor as well as a major field.

Prescribed Courses in the Various Teaching Fields *

		Hours
ART		Credit
One two-term course from the following group:		5
Art 121-22	World History of Art	
Art 151-52	Modern Art	
Art 161-62	History of Art Countries	
Two term courses from the following group:		8
Art 71-72	Introduction to the Arts in America	
Art 131-32	The Design of the House	
Art 141-42	Interior Decoration	
Art 143	Folk Arts of America	
Two two-term courses from the following group:		14
Art 67-68	Drawing and Painting—Life and Portrait	
Art 77-78	Drawing and Painting—Still Life and Portrait	
Art 115-16	Drawing and Painting—Life and Portrait	
Art 175-76	Drawing and Painting—Life and Portrait	
Art 179-80	Sculpture	
Art 183-84	Design and Commercial Art	

Total: 27

BIOLOGY

Biology 1-2	Survey in Biology	6
Biology 1	Structure and Functions of the Flowering Plant	3
Home Economics 152	Nutrition	3
Psychology 115	Psychology	3
Biology 1-2	Introduction to Zoology	12
* Additional courses as approved by the adviser		

Total: 15

* Not required for the minor.

BUSINESS EDUCATION

Credit
Hours

Accounting 1: Introductory Accounting	3
Economics 1-2: Principles of Economics	6
Secretarial Studies 51: Business Correspondence	3

Additional courses as prescribed in one of the following groups:

Group 1—Secretarial Studies

Secretarial Studies 21: Intermediate Typewriting	1
Secretarial Studies 12: Intermediate Shorthand and Transcription	3
Secretarial Studies 15: Advanced Shorthand, Typewriting, and Transcription	3
Secretarial Studies 16: Secretarial Shorthand, Typewriting, and Transcription	3
Secretarial Studies 54: Secretarial Practice	3

*Additional courses from the following, as approved by the adviser:

Accounting 2: Introductory Accounting	3
Business Administration 101: Business Organization and Communication	3
Business Administration 102: Office Management	3
Business Administration 141: Principles of Marketing	3
Business Administration 144: Retailing	3
Economics 121: Money and Banking	3
Political Science 127: Commercial Law	3
Statistics 52: Mathematics of Finance	3

Total

12

Group 2—Bookkeeping, Business Arithmetic, and Business Law

Accounting 21: Introductory Accounting	3
Business Administration 101: Business Organization and Communication	3
Business Administration 102: Business Management	3
Political Science 127-28: Commercial Law	6
Statistics 52: Mathematics of Finance	3

*Two of the following courses, as approved by the adviser:

Accounting 111: Financial Statement Analysis	3
Business Administration 121: General Insurance	3
Business Administration 141: Business Finance	3
Business Administration 128: Investments	3
Economics 121: Money and Banking	3

Total

12

Group 3—Distributive Education

Business Administration 141: Principles of Marketing	3
Business Administration 142: Marketing Problems	3
Business Administration 145: Sales Management	3
Business Administration 151: Retailing	3
*Four of the following courses, as approved by the adviser	12
Business Administration 147: Sales Management Problems	
Business Administration 147: Advertising	

*Not required for the minor.

Business Administration 150:	Principles of Purchasing
Business Administration 158:	Traffic Management
Business Administration 175:	Introduction to Foreign Trade
Business Administration 176:	Exporting and Importing

Total.....

26

CHEMISTRY

Chemistry 11-12	General Chemistry.....	8
Chemistry 21	Qualitative Inorganic Analysis..	4
Chemistry 22	Quantitative Inorganic Analysis..	4
Chemistry 151-52	Organic Chemistry.....	8
Chemistry 191	History of Chemistry.....	2
*One of the following.....		8-10
Chemistry 111-12 and 113-14	Physical Chemistry	
Biochemistry 221-22	Biochemistry	

Total.....

34 37

ELEMENTARY EDUCATION

Education 113:	Elementary School Art.....	3
Education 114:	Elementary School Music.....	3
Education 128	Children's Literature.....	3
Science, as approved by adviser.....		6-14
Geography 51	Introduction to Geography.....	3
Geography 52	World Regions.....	3
Physical Education 101	Physical Education in Elementary School..	6
Political Science 9-10	Government of the United States.....	6
Total.....		30-38

ENGLISH

English 1, 2	English Composition.....	6
English 52	Introduction to English Literature.....	3
English 71-72	Introduction to American Literature.....	6
English 125	The Evolution of Modern Speech.....	3
English 135-37	Shakespeare.....	6
Speech 11	Training the Speaking Voice.....	3
*Three of the following term courses, with the approval of the adviser.....		9
English 126	The Appreciation of Literature	
English 151-52	The Romantic Movement	
English 161-62	Victorian Literature	
English 175-76	The Twentieth Century	
English 171-72	Studies in American Literature	
English 173-74	Major American Poets	
English 176	American Drama	
English 177-78	American Fiction	
English 182	The English Novel	
English 199	Seminar	

Total.....

36

* Not required for the minor.

FRENCH

French 1-2: First-year French.....	6
French 3-4: Second-year French.....	6
French 9-10: French Conversation and Composition.....	6
French 51-52: Survey of French Literature and Civilization.....	6
*Additional courses in French, as approved by the adviser.....	12
Total.....	36

GEOGRAPHY

Geography 51: Introduction to Geography.....	3
Geography 52: World Regions.....	3
Geography 1-3-4: Cartography.....	6
Geography 113: Geomorphology.....	3
Geography 114: Weather and Climate.....	3
Geography 151: Economic Geography of the United States.....	3
Geography 152: Political Geography of the United States.....	3
*Two of the following term courses.....	6
Geography 183: Northwest Europe.....	
Geography 184: The Mediterranean.....	
Geography 191: Middle America.....	
Geography 192: South America.....	
Geography 195: Eastern and Southeastern Asia.....	
Geography 197: The Pacific.....	
Geography 198: Australia.....	
*Two of the following term courses.....	6
Geography 125: Economic Geography: Trade and Transportation.....	
Geography 126: Economic Geography: Raw Materials.....	
Geography 127: Economic Geography: Manufacture.....	
Geography 128: Economic Geography: Agriculture.....	
Geography 131: Conservation of Natural Resources.....	
Geography 132: Land Use.....	
Geography 141: Geography of Settlement.....	
Geography 142: Urban Geography.....	
Total.....	36

GERMAN

German 1-2: First-year German.....	6
German 3-4: Second-year German.....	6
German 51-52: Introduction to German Literature.....	6
*Additional courses in German, as approved by the adviser.....	18
Total.....	36

HISTORY

History 39-40: The Development of European Civilization.....	6
History 71-72: The Development of the Civilization of the United States.....	6

* Not required for the minor

Six credit hours, as approved by the adviser, from each of the following groups.....	18
Group 1—American History.....	
History 171-72 Social History of the United States.....	
History 173 Representative Americans.....	
History 174 Economic History of the United States.....	
History 181-82 Diplomatic History of the United States.....	
Group 2—European History.....	
History 109 Thought and Culture of the Western World I: Ancient Civilization.....	
History 110 Thought and Culture of the Western World II: The Middle Ages and the Renaissance.....	
History 111 Nationalism.....	
History 141-42 Russian History.....	
History 143 Economic History of Europe.....	
History 144-45 European Diplomatic History.....	
History 151-52 English History.....	
*Group 3—Latin American History.....	
History 163 Latin American History: Colonial Period.....	
History 164 Latin American History: Independence.....	
History 165 Mexico and the Caribbean since Independence.....	
Political Science 177 Recent Trends in Latin American Politics and Government.....	
Political Science 178 International Politics in the Western Hemisphere.....	
*Additional credit hours, as approved by the adviser, from one of the following groups.....	6
Total.....	24

MATHEMATICS

Mathematics 3 College Algebra.....	3
Mathematics 4 Plane Trigonometry.....	3
Mathematics 121 Analytic Geometry.....	3
Mathematics 12 Differential Calculus.....	3
Mathematics 80 Integral Calculus.....	3
*Mathematics 123 Theory of Equations, or.....	3
*Mathematics 124 Advanced Algebra.....	3
*Mathematics 132 Differential Equations, or.....	3
*Mathematics 139 Advanced Calculus.....	3
*An additional course in Mathematics, as approved by the adviser.....	3
Statistics 50 Mathematics of Finance.....	3
Total.....	27

PHYSICS

Physics 5, 6, 7, and 8 General Physics.....	12
Physics 55 Physical Measurements.....	3
Physics 101 Mechanics.....	3
Physics 105 Principles of Electricity.....	3
Physics 106 Optics.....	3

* Not required for the minor.

*Chemistry Elective—Chemistry 11-12: General Chemistry or Chemistry 12-21: General Chemistry and Quantitative Inorganic Analysis	8
Mathematics 12: Analytic Geometry	3
Mathematics 19: Differential Calculus	3
Mathematics 20: Integral Calculus	3
*Six credit hours to be selected from the following	0
Physics 1-2: Heat and Thermodynamics	
Physics 113: Atomic Physics	
Physics 114: Statistical Physics	
Physics 128: Sound	
Physics 132: Electronics	
Physics 155-56: Advanced Physical Measurements	

Total	47
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SOCIAL STUDIES

History 39-42: The Development of European Civilization	6
History 71-72: The Development of the Civilization of the United States	6
Political Science 9-10: Government of the United States	6
Two of the following courses	12
Economics 1-2: Principles of Economics	
Geography 51, 52: Introduction to Geography and World Regions	
Religion 53-54: History of Religions	
Sociology 1-2: Introductory Sociology	
*A national second-group system, as approved by the adviser, from one of the following fields: Economics, Geography, History, Political Science, Religion, Sociology	12
Total	42

SPANISH

Spanish 1-2: First-year Spanish	6
Spanish 3-4: Second-year Spanish	6
Spanish 9-11: Spanish Conversation and Composition	6
*Additional courses as approved by the adviser	18
Total	36

SPANISH

1: Fluency Speaking	3
2: Penetrative Speaking	3
11: Teaching the Speaking Voice	3
12: Oral Reading	3
101: Voice and Phonetics	3
121: Group Discussion and Conference Leadership	3
153: Play Production	3
175: Speech Composition	3

*Not counted for the minor

One of the following areas of specialization, as approved by the adviser:

•Group 1—Speech Arts	12
Twelve credit hours to be chosen from the following:	
Speech 122: Oral Interpretation of Literature	
Speech 126: Public Discussion and Debate	
Speech 154: Play Production	
Speech 160: History of the Theater	
Speech 169: Creative Dramatics and Children's Theater	
•Group 2—Speech Correction	12
Twelve credit hours to be chosen from the following:	
Speech 176: Speech Correction	
Speech 177-78: Clinical Practice in Speech Therapy	
Speech 182: Introduction to Hearing Problems	
Speech 183-84: Clinical Practice in Hearing Therapy	
Additional courses in English, Physiology, Psychology, or Speech, as approved by the adviser	
Total.....	36

PROFESSIONAL EDUCATION

The basic professional information, skills, and attitudes needed by beginning teachers are provided through a sequence of courses to be taken in the junior and senior years. Lectures and class discussions are closely coordinated with field work. Instruction is differentiated to meet the needs of those preparing to teach on the various levels—elementary school, junior high school, senior high school, and adult.

Professional Courses—Secondary

Education 109-110: Learning and Teaching.....	6
Education 121-22: Society and the School.....	6
•Education 131: Common Teaching Skills.....	3
Education 133-34: Observation and Student Teaching.....	6-6
•Education 139 to 152: Special Methods.....	3-6
Total.....	24-32

Professional Courses—Elementary

Education 109-110: Learning and Teaching.....	6
Education 121-22: Society and the School.....	6
Education 111: Elementary School Curriculum.....	6-6
Education 133-34: Observation and Student Teaching.....	6-6
Total.....	24-32

Bachelor of Science in Home Economics

The curriculum leading to this degree is designed to prepare young women for the important responsibility of home making. The program

• Not required for the minor.

can be adapted, however, to meet special requirements in nutrition, dietetics, clothing, and other related fields. Each student must plan her work with the assistance of a faculty adviser in the Department of Home Economics.

GENERAL HOME-MAKING

JUNIOR YEAR	Credit Hours	SENIOR YEAR	Credit Hours
Home Economics 53.....	3	Home Economics 152.....	3
Home Economics 72.....	3	Home Economics 171.....	3
Home Economics 112.....	3	Home Economics 181.....	3
Home Economics 121.....	3	Home Economics 192.....	3
Physiology 115.....	3	Home Economics 197-98.....	6
Electives.....	15	Electives.....	12
Total.....	30	Total.....	30

Bachelor of Science in Physical Education for Men

There are three curricula leading to this degree. The Single-Major and Subject-Certification Teacher's Curriculum is designed to prepare students for teaching positions in smaller schools where it is necessary to teach an academic subject in addition to physical education. The Single-Major Teacher's Curriculum prepares for the teaching of physical education in the larger schools. The Physical Education and Recreation Curriculum has been planned for those who wish to be prepared to direct programs of recreation in addition to the teaching of physical education.

The minimum requirements for this degree are sixty-six credit hours, distributed as follows:

SINGLE MAJOR AND SUBJECT-CERTIFICATION TEACHER'S CURRICULUM

The minimum requirements for this degree are twenty-one credit hours in education, twenty-four credit hours in physical education, eighteen credit hours in an academic teaching field, and three credit hours in physiology, distributed as follows:

JUNIOR YEAR	Credit Hours	SENIOR YEAR	Credit Hours
Education 119-121.....	9	Education 131.....	3
Education 121-22.....	9	Education 133-34.....	6
Physical Education 113.....	3	Physical Education 115-16.....	4
Physical Education 115.....	3	Physical Education 122.....	3
Physical Education 117.....	1	Physical Education 131.....	3
Physical Education 118-14.....	4	Physical Education 138.....	3
Physiology 115.....	3	Academic teaching field.....	11
Academic teaching field.....	7	Total.....	33
Total.....	33		

SINGLE-MAJOR TEACHER'S CURRICULUM

The minimum requirements for this degree are twenty-one credit hours in education, twenty-eight credit hours in physical education, three credit hours in physiology, and fourteen credit hours of electives:

JUNIOR YEAR		Credit Hours	SENIOR YEAR		Credit Hours
Education 109-10	.....	6	Education 131	.....	3
Education 121-22	.....	6	Education 133-34	.....	6
Physical Education 103	.....	3	Physical Education 135	.....	3
Physical Education 107	.....	1	Physical Education 122	.....	3
Physical Education 109-10	.....	4	Physical Education 131	.....	3
Physical Education 113-14	.....	4	Physical Education 133	.....	3
Physical Education 115-16	.....	4	Electives	.....	12
Physiology 115	.....	3	Total	.....	33
Electives	.....	2			
Total	.....	33			

PHYSICAL EDUCATION AND RECREATION CURRICULUM

The minimum requirements for this course are sixty-six credit hours distributed as follows:

JUNIOR YEAR		Credit Hours	SENIOR YEAR		Credit Hours
Education 109	.....	3	Education 131	.....	3
Education 121-22	.....	6	Education 133-34	.....	6
Physical Education 103	.....	2	Physical Education 135	.....	3
Physical Education 107	.....	1	Physical Education 122	.....	3
Physical Education 109-10	.....	4	Physical Education 131	.....	3
Physical Education 113-14	.....	4	Physical Education 133	.....	3
Physical Education 131	.....	1	Physical Education 135	.....	3
Physical Education 131-32	.....	2	Physical Education 137	.....	6
Electives	.....	2	Electives	.....	31
Total	.....	33	Total	.....	66

Bachelor of Science in Physical Education for Women

There are three curricula leading to this degree. The Dual-Major Teacher's Curriculum is designed to prepare students for teaching positions in smaller schools where it is necessary to teach an academic subject in addition to physical education. The Single-Major Teacher's Curriculum prepares for the teaching of physical education in the larger schools. Within this course there is opportunity for specialization in dance, sports, or correctives. The Physical Education and Recreation Curriculum has been planned for those who wish to be prepared to direct programs of recreation in addition to the teaching of physical education.

The minimum requirements for this degree are sixty-six credit hours distributed as follows:

DUAL- OR SINGLE-MAJOR TEACHER'S CURRICULUM

The student desiring to prepare herself to teach another subject in addition to Physical Education for Women may do so by choosing her elective hours from one subject matter field with the advice of the Dean of the School of Education. Relevant work completed in the Junior College may be counted in this subject matter field.

JUNIOR YEAR	Credit Hours	SENIOR YEAR	Credit Hours
Education 109-110	2	Education 121-122	6
Physical Education 58	2	Education 133-134	6
Physical Education 101	3	Physical Education 113-114	4
Physical Education 103	3	Physical Education 121	3
Physical Education 105-106	6	Physical Education 122	3
Physical Education 107	1	Physical Education 131	3
Physical Education 111-112	2	Physical Education 138	3
Physical Education 117-118	2	Electives	2
Physical Education 141	1		
Psychology 115	3	Total	34
Education 145	3		
Total	34		

PHYSICAL EDUCATION AND RECREATION CURRICULUM

JUNIOR YEAR	Credit Hours	SENIOR YEAR	Credit Hours
Physical Education 48	2	Education 121-122	6
Physical Education 58	2	Education 133-134	6
Physical Education 101	3	Physical Education 103	3
Physical Education 105-106	6	Physical Education 113-114	4
Physical Education 107	1	Physical Education 122	3
Physical Education 107-108	4	Physical Education 112	1
Physical Education 111-112	2	Physical Education 118	3
Physical Education 117-118	2	Physical Education 121	3
Physical Education 131-132	6	Physical Education 132	3
Psychology 115	3		
Education 145	3	Total	32
Total	34		

THE DEGREE OF MASTER OF ARTS IN EDUCATION

Upon the satisfactory completion of the graduate requirements of the School of Education, the degree of Master of Arts in Education is conferred. This is a professional degree, designed to prepare the student for some particular type of educational service. The program of studies leading to the degree is selected by the candidate and his adviser from the various related departments of the University to give the student an adequate background in his chosen vocational field. For the prospective high school or junior high school teacher this will ordinarily include

study in the subject which he is planning to teach as well as in the field of education.

In accordance with the foregoing general pattern of work, graduate programs of study are available in the following fields: (1) school administration—secondary school principalship or elementary school principalship; (2) adult education; (3) secondary education—senior or junior high school; (4) elementary education—intermediate grade or early childhood education; (5) agricultural extension education; (6) curriculum; (7) employee training; (8) guidance; (9) reading. Programs of work for teachers in service are differentiated from those for students without teaching experience. Additional information concerning these programs may be obtained by writing to the Dean.

ADMISSION TO CANDIDACY

The requirements for admission to candidacy for the Master's degree are stated on page 19. Those desiring to prepare for positions in guidance or administration must have had at least two years of successful teaching experience. Candidates who have had no professional courses must satisfactorily complete the required undergraduate professional courses, including Observation and Student Teaching, in addition to graduate course requirements.

ADVANCED STANDING

Graduate work completed in other accredited institutions of learning may be credited toward the Master's degree, but a minimum of thirty credit hours must be completed at The George Washington University as a matriculated candidate for the degree in the School of Education.

Advanced courses completed in excess of the requirements for the Bachelor's degree in this University may be credited toward the Master's degree to the extent of twelve credit hours, provided the work fits in with the student's plan of specialization and is approved in writing by the Dean before being undertaken.

In determining advanced standing at the time of admission or readmission to Master's candidacy at this University, graduate work completed more than three years previously is not counted.

REQUIREMENTS FOR THE DEGREE

PLANS OF STUDY

Two plans of study lead to the degree of Master of Arts. *Plan 1* requires a minimum of thirty hours of graduate credit, including a thesis carrying six hours of graduate credit. *Plan 2* requires a minimum of thirty-three hours of graduate credit, including the course in Educa-

tional Research Methods and Procedures carrying three hours of graduate credit.

SELECTION OF COURSES

Programs of study under *Plan 1* must include a minimum of twelve credit hours from third group courses in addition to the thesis. Under *Plan 2* a minimum of eighteen credit hours, in addition to the course in *Educational Research Methods and Procedures*, must be from third-group courses.

Programs of study must include a minimum of twelve credit hours selected from courses offered in the Department of Education.

When programs of study include additional academic preparation in one or more teaching fields, undergraduate and graduate courses combined must be at least equivalent to the undergraduate requirements of the Bachelor of Arts degree in the teaching field concerned.

RESIDENCE

Candidates for the degree of Master of Arts in Education must complete satisfactorily at this University a minimum of thirty credit hours, nine of which, with the approval of the adviser, may be in the College of General Studies off campus courses.

THE THESIS

The thesis required under *Plan 1* must conform to standards prescribed. A statement of these standards may be obtained at the Office of the Dean.

The thesis subject must be approved in writing by the candidate's adviser and recorded in the Office of the Registrar by the date announced in the University calendar. One typewritten original and two legible and complete carbon copies of the thesis in its final form (on official thesis paper) must be presented to the Dean by the candidate not later than the date announced in the University calendar. Requirements regarding the form of the thesis are stated on pages 49-50, and additional information will be supplied by the Dean.

Payment of tuition for the thesis will entitle the candidate, during the academic year of registration, to the advice and direction of the member of the Faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year may be granted without further tuition payment. If the preparation of the thesis extends beyond the two-year period it must be registered for again and tuition paid on the same basis as for a repeated course.

COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a professional comprehensive examination in two parts: (1) a general examination concerned with an integrated understanding of the major areas in professional education, and (2) a special examination concerned with the candidate's area of specialization.

The general part of the comprehensive examination is divided into three groups as follows: Group I (Foundations) covers learning and teaching, society and the school, child growth and development, history of education, philosophy of education, and educational research; Group II (Major Levels) covers elementary education, secondary education, adult education, employee training, and vocational education; Group III (Common Elements) covers administration, curriculum, evaluation, guidance, methodology, and reading.

The candidate must be prepared to answer two questions in each group, none of which shall be concerned with his area of specialization.

FIVE-YEAR PROGRAM

A candidate entering the School of Education from the Junior College (or with equivalent preparation) may choose a three-year program leading to the degrees of Bachelor of Arts and Master of Arts in Education to be conferred simultaneously. The first year of this combined program will be devoted to teaching-field preparation; the work of the second year will include the Bachelor of Arts junior-year professional courses and a maximum of eighteen credit hours of graduate courses; that of the third and final year, senior-year undergraduate professional courses and the remaining graduate courses needed for the Master's degree. Observation and Student Teaching to be elected in the third year may not be taken for graduate credit. A quality-point index of at least 2.50 must be attained before beginning the work of the senior year and the program must meet all the requirements for the degrees of Bachelor of Arts and the Master of Arts in Education.

THE ADVANCED PROFESSIONAL CERTIFICATE

Upon the satisfactory completion of the program of advanced graduate studies of the School of Education, the Advanced Professional Certificate is granted. This program is designed to prepare teachers and administrators for more effective service in their chosen fields and to enable them to qualify for a higher step in the local salary scale.

The program of studies leading to the certificate is selected by the candidate and his advisor from the various related departments of the University in accordance with his needs. In general it includes

thirty hours of graduate credit beyond the Master's degree. The candidate wishing to increase his teaching proficiency may include additional study in his teaching field. For information concerning available programs, see the separate catalogue of the School of Education.

ADMISSION TO CANDIDACY

The requirements for admission to candidacy for the Advanced Professional Certificate are stated on page 20. The applicant who is unable to meet the admission requirements may be admitted with deficiencies to be met by satisfactorily completing prerequisites in addition to the specified program of graduate study. Each applicant must be interviewed by a member of the Faculty of the School of Education. The applicant seeking to qualify for a higher level in the local salary scale must have his program approved by the appropriate representative of the school system employing him.

TRANSFER OF CREDIT

Appropriate graduate work completed in other accredited higher institutions may be credited toward the requirements for the Certificate, but a minimum of eighteen credit hours must be completed at The George Washington University as a matriculated candidate in the School of Education. The candidate is encouraged to include in his program study at other accredited higher institutions when such study seems to be in his best interest. In determining advanced standing at the time of admission or readmission to Certificate candidacy, graduate work completed more than three years previously is not counted.

REQUIREMENTS FOR THE CERTIFICATE

Plans of Study

In planning his program of studies the candidate should give first consideration to his particular needs. If he is a teacher and his graduate study leading to the Master's degree was largely in professional education he may find it desirable to emphasize additional mastery of the teaching field. If his Master's preparation was in a content field, he may wish to devote a major part of his program to additional professional study. Those in administration and related services may wish to continue specialization on a more advanced level.

The program of study must include, in addition to any prerequisites, a minimum of thirty hours of graduate credit in third group courses and not less than twelve credit hours in courses offered by the School of Education.

RESIDENCE

Candidates for the Advanced Professional Certificate must complete satisfactorily at this University a minimum of eighteen credit hours in courses offered on the campus. The balance of the program may be in the College of General Studies off-campus courses or in other approved institutions of higher learning. The candidate is not required to pursue his program of study continuously. On request a leave of absence is granted to the candidate for a period not to exceed three years.

THE DEGREE OF DOCTOR OF EDUCATION

The requirements for the degree of Doctor of Education cannot be stated in credit hours, but they consist in general of at least two full years of work beyond the degree of Master of Arts in Education or the equivalent. The programs of study are designed to prepare students for administrative or supervisory positions, the teaching of education in normal schools or colleges, the teaching of an academic subject in schools or colleges, or for specialized types of educational service. The work is given a practical rather than a theoretical bent, and emphasizes the mastery and application of subject matter, both in the study requirements and in the dissertation. Special emphasis is placed upon the professional success of the candidate.

The candidate's program of study largely depends upon his previous educational background and his professional objective. Opportunities are provided for study leading to the following professional objectives: school superintendent, secondary school principal, elementary school principal, supervisor, director of guidance, director of curriculum development, professor of education, and specialist in educational research.

QUALIFICATIONS OF THE APPLICANT

The candidate for the degree of Doctor of Education must have completed (1) graduate work in fields prerequisite to his objective, equivalent to that required for the degree of Master of Arts in Education in The George Washington University, and (2) at least three years of successful educational experience.

ADMISSION TO CANDIDACY

To be admitted to candidacy for the degree the applicant must be accepted by the Faculty of the School of Education on the basis of an examination conducted by a committee appointed by the Dean. This examination will usually include the following: (1) a written examination involving problems related to the applicant's background; (2) a scholastic aptitude test; (3) an oral examination.

CONSULTATIVE COMMITTEE

If the applicant is accepted as a candidate, his consultative committee will counsel the candidate and guide his work.

The consultative committee, in cooperation with the candidate, will (1) determine the candidate's fields of study, in each of which the candidate must pass a written examination at least eight months before he presents himself for the degree; (2) formulate a list of course requirements and of readings that will assist him in preparing for the examinations; and (3) designate the tools of investigation that will be needed by the candidate in the prosecution of his study. These tools may include one or more foreign languages, statistical methods, historical criticism, or any others considered essential by the committee. An examination in the tools designated must be passed by the candidate before he takes his comprehensive examination.

THE DISSERTATION

When the candidate has satisfied the requirements of his consultative committee, the committee is dissolved. A member of the Faculty, in whose field the topic of the dissertation falls, is then appointed to serve as the candidate's adviser on his dissertation and in his field of specialization, and to recommend him to the Dean for the final oral examination when, in his judgment, the candidate's dissertation is acceptable.

Not later than the date specified in the University calendar the candidate shall submit to the Dean of the School of Education three copies of his dissertation—one typewritten original and two legible and complete carbon copies, on official thesis paper—and also a typewritten summary of the dissertation consisting of not more than 2,500 words. Requirements regarding the form of the dissertation are stated on pages 49-50, and additional information will be supplied by the Dean.

The successful candidate is required, before receiving his degree, to pay a fee to cover the expense of printing the summary of his dissertation.

THE FINAL EXAMINATION

At least three weeks before the degree is to be conferred the candidate must pass an oral examination on his dissertation and on his field of specialization before a committee of the Faculty appointed by the Dean, supplemented by two experts from outside the University appointed by the President. This examination is open to the public and all are privileged to question the candidate. The Dean, or a member of the Faculty designated by him, will preside at this examination.

THE SCHOOL OF GOVERNMENT

THE FACULTY AND STAFF OF INSTRUCTION*

Arthur Edward Burns, Ph.D., *Dean of the School of Government*
 Joe Lee Jessup, M.B.A., *Assistant Dean in the School of Government*

Richard Norman Owens, Ph.D., C.P.A., *Professor of Business Administration*

Elmer Louis Kayser, Ph.D., LL.D., *Professor of European History*

Warren Reed West, Ph.D., *Professor of Political Science*

Frank Mark Weida, Ph.D., *Professor of Statistics*

Harold Griffith Sutton, M.S., *Professor of Finance*

Mitchell Dreese, Ph.D., *Professor of Educational Psychology*

†Ralph Dale Kennedy, Ph.D., *Professor of Accounting*

Wood Gray, Ph.D., *Professor of American History*

Thebma Hunt, Ph.D., M.D., *Professor of Psychology*

Arthur Edward Burns, Ph.D., *Professor of Economics*

John Withrow Brewer, Ph.D., *Professor of International Law*

§Harold Loran Geisert, Ph.D., *Professor of Sociology*

Howard Maxwell Merriman, Ph.D., *Professor of American Diplomatic History*

Alan Thomas Deibert, A.M., *Professor of Romance Languages*

Donald Stevenson Watson, Ph.D., *Professor of Economics*

||Myron Law Koenig, Ph.D., *Professor of American History*

Arla Rex Johnson, Ph.D., *Professor of Public Administration*

Everett Herschel Johnson, Ph.D., *Professor of Statistics*

Joe Lee Jessup, M.B.A., *Professor of Business Administration*

Robert Dale Campbell, Ph.D., *Professor of Geography*

Roderic Hildett Davison, Ph.D., *Professor of European History*

Wolfgang Herbert Kraus, Dr. Jur., S.J.D., *Professor of Political Science*

Henry Furness Hubbard, Ph.D., *Professorial Lecturer in Psychology*

Gerhard Colin, Dr. rer. pol., *Professorial Lecturer in Economics*

Orton Wells Boyd, A.M., C.P.A., *Professorial Lecturer in Accounting*

James Carlton Dockeray, Ph.D., *Professorial Lecturer in Business Administration*

Montell Ernest Ogden, Ph.D., *Professorial Lecturer in Business Administration*

* The President of the University, the Dean of Faculties of the University, the Dean of the School, the President of the University, the Director of Admissions of the University, Professors, Assistant Professors, Associate Professors, and Assistant Professors constitute the Faculty.

† On leave of absence spring term 1935-36.

‡ On leave of absence 1933-34.

§ On leave of absence 1935-36.

- Ralph Aubrey Young, M.B.A., Ph.D., *Professorial Lecturer in Economics*
- Karl Ernest Stromsem, Ph.D., *Professorial Lecturer on Public Administration*
- Jacques Jacobus Polak, Ph.D., *Professorial Lecturer in Economics*
- Joseph Leo Kreiger, M.B.A., *Professorial Lecturer in Business Administration*
- Edwin Lewis, M.B.A., *Professorial Lecturer in Accounting*
- Carl William Clewlow, A.M., *Professorial Lecturer in Business Administration*
- Eugene Fields, B.S., C.P.C.U., *Professorial Lecturer on Insurance*
- Fred Latimer Hadsel, Ph.D., *Professorial Lecturer in Political Science*
- Clarence McLaughlin, B.S., LL.B., *Professorial Lecturer in Accounting*
- Henry Alexander Berry, M.B.A., C.P.A., *Professorial Lecturer in Accounting*
- Forest Carlyle Brimacombe, M.B.A., *Professorial Lecturer in Accounting*
- Vra Ernest Steele, A.M., *Professorial Lecturer in Accounting*
- James Leonard Buckler, A.M., *Professorial Lecturer in Accounting*
- Fred Vincent Demaret, M.S., *Professorial Lecturer in Accounting*
- Harold Jerome Bobys, A.B., C.P.A., *Professorial Lecturer in Accounting*
- Harvey Porter Hall, A.M., *Professorial Lecturer in Political Science*
- John Jay Corson, Ph.D., *Professorial Lecturer in Business Administration*
- William George Torpey, Ph.D., *Professorial Lecturer on Public Administration*
- Frederick Thorp Moore, Ph.D., *Professorial Lecturer in Economics*
- Reuben Harchow, M.B.A., LL.B., *Professorial Lecturer in Business Administration*
- Edward Campion Acheson, Ph.D., *Associate Professor of Finance*
- Antonio Alonso, A.M., *Associate Professor of Spanish*
- Wilhelm Karl Legner, Ph.D., *Associate Professor of German*
- Carl Bartleson Lavell, A.M., *Associate Professor of Sociology*
- Don Carlos Farth, Ph.D., *Associate Professor of Educational Psychology*
- James Norman Mosel, A.M., *Associate Professor of Psychology*
- Rafael Supervia, Doctor en Derecho, *Associate Professor of Spanish*
- Gaston Gouverneur Barnswall, Ph.D., *Associate Professor of Business Administration*
- William Columbus Davis, Ph.D., *Associate Professor of Latin American History*
- David Springer Brown, Ph.D., *Associate Professor of Public Administration*

Ronald Bettes Thompson, Ph.D., *Associate Professor of European History*

James Coogan, Ph.D., *Associate Professor of Economics*

Richard Catlin Haskett, Ph.D., *Assistant Professor of American History*

Howard Rowland Ludden, A.M., *Assistant Professor of Political Science*

Walter David Fackler, A.B., *Assistant Professor of Economics*

Helen Zhemchuzhnaya Yakobson, B.S., *Assistant Professor of Russian*

Wilson Emerson Schmidt, Ph.D., *Assistant Professor of Economics*

*Harland Walter Westermann, A.M., *Assistant Professor of Geography*

Solomon Kullback, Ph.D., *Lecturer in Statistics*

Joseph Patrick Murphy, A.B., LL.B., LL.M., *Lecturer in Political Science*

John Samuel Myers, Ph.D., *Lecturer on Public Administration*

Augustus Clark Johnson, A.M., *Lecturer in Business Administration*

Chester Hayden McCall, Jr., A.M., *Instructor in Statistics*

Wilbur Earle Benson, M.B.A., *Instructor in Accounting*

Frederick Timberlake, M.B.A., *Instructor in Business Administration*

COMMITTEES‡

THE DEAN'S COUNCIL §

1955

David Springer Brown

Howard Rowland Ludden

1956

Wilson Emerson Schmidt

Ralph Dale Kennedy

1957

Gordon Gouverneur Barnewall

Richard Catlin Haskett

COMMITTEE ON ADMISSION AND ADVANCED STANDING

John Withrow Brewer, *Chairman*

Frank Mark Weida

Howard Maxwell Merriman

EXECUTIVE COMMITTEE, BUREAU OF BUSINESS AND ECONOMIC RESEARCH

Joe Lee Jessup, *Chairman*

Richard Norman Owens

Donald Stevenson Watson

Ralph Dale Kennedy

Everett Herschel Johnson

* On leave of absence 1955-56.

‡ The President of the University and the Dean of the School of Government are members ex officio of all committees.

§ Elected by the Faculty.

COMMITTEE ON DOCTORAL STUDIES

Ralph Dale Kennedy, *Chairman*

Richard Norman Owens

Frank Mark Weida

Donald Stevenson Watson

Everett Herschel Johnson

GENERAL INFORMATION

INTRODUCTORY

The George Washington University has provided training in both foreign service and governmental theory and administration throughout its history. This was one of its purposes when chartered in 1821. The School of Government was established in 1928 to bring together in various undergraduate and graduate curricula the work offered in foreign service and much of the other academic work in the theory and administration of government.

It is the purpose of the School to give the student an understanding of his responsibilities under the Constitution of the United States in the conduct of public office, domestic and foreign, and to prepare students for careers not only in governmental service but also in related business and professional fields. This can be accomplished not through any single course but through curricula which correlate social, economic, political, historical, business, and psychological studies.

The program embraces both graduate and undergraduate work. Curricula leading to the degree of Bachelor of Arts in Government are offered in Foreign Affairs, Accounting, Business Administration, and Business and Economic Statistics. Graduate work leading to a Master's degree is available in each of these fields and in Economic Policy, Public Administration, Personnel Administration, Counseling, and Psychometrics. Graduate study leading to the degree of Doctor of Business Administration is also available (see pages 190-91).

The Foreign Affairs program is broad, covering international political relations, international trade and finance, international communications, and regional studies. Its purpose is to equip students, by providing general background and specialized work, for careers in the field of American foreign relations. The diplomatic service of the United States, the several agencies of government with responsibilities in the international field, the international organizations, and American enterprise abroad offer opportunities in this field.

Governmental service requires special training and background in many other subjects, including economic research, statistical investigation, accounting, administrative management, and personnel administration. The academic background for such work is offered in the various curricula of the School and is described below.

REGULATIONS

Students in the School of Government are subject to, and are expected to familiarize themselves with, the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 12-27, and the University regulations stated on pages 44-57.

AMOUNT OF WORK

A full-time student not on probation may take ordinarily not more than seventeen credit hours. A student employed more than twenty-four hours a week, who is not on probation, may take not more than ten credit hours.

A full-time undergraduate student whose quality point index is 3.50 or higher may take not more than nineteen credit hours. An undergraduate student employed more than twenty-four hours a week, whose quality-point index is 3.50 or higher, may take up to twelve credit hours.

Exception to these rules will require the approval of the Dean.

ATTENDANCE

The student is held responsible for all the work of the courses in which he is registered, and all absences must be excused by the instructor in charge before provision is made for him to make up the work missed.

CLASSIFICATION OF STUDENTS

A student who holds an Associate in Arts degree from the Junior College or the equivalent from another accredited institution, and who has registered his choice of one of the prescribed curricula at the Office of the Registrar, is classed as a *junior*. A student who has completed thirty credit hours in the School of Government is classed as a *senior*. A student who has satisfactorily completed the work for a Bachelor's degree and who has registered his choice of one of the prescribed fields of study at the Office of the Registrar, is classed as a *master in course*.

INDEPENDENT STUDY PLAN

Under the independent study plan a student of demonstrated capacity, with special interest in the subject matter of a course, may be permitted to undertake independent study under the personal direction of an in-

structor, in accordance with the rules of the division in which the subject falls. Credit under this plan is limited to the specific course credits as designated in the list of courses of instruction in this CATALOGUE.

THE DEGREE OF BACHELOR OF ARTS IN GOVERNMENT

Upon the satisfactory completion of the undergraduate requirements of the School of Government, the degree of Bachelor of Arts in Government, with a designation of the major field of study, is conferred. The major fields are Foreign Affairs, Accounting, Business Administration, and Business and Economic Statistics.

Students who have a special need for integrating courses from several departments or from more than one major field may request approval by a faculty committee, of a special major program. The same rules and regulations will apply as in the regularly offered majors.

Requirements for the undergraduate major in Economics and Public Administration are stated under the departments of Economics and Political Science, respectively, and are administered by Columbian College.

REQUIREMENTS FOR THE DEGREE

SCHOLARSHIP

The system of grading and of computing scholarship is described in detail on pages 44 and 45.

In order to graduate, a student must have the following: (1) a quality point index in all of his work of at least 2.00, and (2) a quality point index of at least 2.50 in his major. The major includes the required courses and courses taken in the group options.

Probation—A student must maintain a quality point index of at least 2.00, or be placed on probation, where he will remain as long as his quality point index is below 2.00.

Suspension—A student who has a quality point index below 1.50 or who is placed on probation for a third term, whether successive or after an interval, will be suspended.

A student suspended for poor scholarship may apply for readmission after an interval of one calendar year. He must then submit evidence to the Committee on Admission and Advanced Standing that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student suspended twice for poor scholarship will not be readmitted.

A student with a limited schedule is affected by the foregoing scholarship rules only when he has undertaken fifteen credit hours.

RESIDENCE

For residence requirements, see the University regulations on pages 48-49.

CURRICULUM REQUIREMENTS

To be recommended by the Faculty for graduation, candidates in the School of Government are required to complete, in addition to the appropriate Junior College work (see curricula on pages 67 and 68), a minimum of sixty credit hours during the junior and senior college years, as set forth in one of the following curricula:

Foreign Affairs		Credit Hours
Econ. 181-82... International Economics		6
Hist. 15... European Diplomatic History Since 1871		3
or Pol. Sc. 171... International Politics		6
Hist. 181-82... International History of the United States		3
Pol. Sc. 172... International Organization: the United Nations		3
Pol. Sc. 181-82... International Law		6
Language... Composition and Conversation		3
Geography		18
Group Option: (1) to be selected from one of the following groups:		9
Electives	(1) to be selected in consultation with adviser:	6
Total		60

All foreign affairs majors must complete the *required* courses listed above. The group option provides specialization in international politics, international economics, international communications, or a geographic region, depending upon the student's interest. Normally no more than six credit hours may be taken in an option other than the one selected. Consent of the adviser must be obtained for such modification of the option selected.

Group I—International Politics

This group option (18 credit hours as noted in list above) is composed of courses in the departments of Political Science, History, and Geography which are related to the study of American diplomatic relations. The selection of courses must be made in consultation with the adviser.

Group II—International Economic Relations

This group option (18 credit hours as noted in list above) is composed of courses offered primarily by the departments of Economics and Business Administration which are related to the study of American economic, financial, and business relationships with foreign countries. The selection of courses must be made in consultation with the adviser.

Group III—International Communications

This group option (18 credit hours as noted in list above) is composed of courses offered primarily by the departments of Political Science, Psychology, Sociology, and Journalism which are related to the study of international relations, public opinion, psychological warfare, cultural relations, and public relations. (It is recommended that the student include attention in his Junior College program.) The selection of courses must be made in consultation with the adviser.

Group IV—Area or Regional Studies

The group option (18 credit hours as noted in the list above) may be selected from courses offered in the departments of Economics, History, Political Science, and Geography. Integrated programs of study are available in the following regions or areas: Europe and the Middle East, Asia and the Pacific Area, the Soviet Union, and Latin America. Modifications and combinations of these areas may be made if approved by the adviser, who must also approve the individual courses selected for the option. The foreign language, noted in list above, should be one that is suitable for study of the region or area selected.

Business Administration		Credit Hours
Bus. Adm. 101.....	Business Organization and Combination.....	3
Bus. Adm. 102.....	Business Management.....	3
Bus. Adm. 105.....	Business Management in Industry.....	3
Bus. Adm. 131.....	Business Finance.....	3
Bus. Adm. 141.....	Principles of Marketing.....	3
Bus. Adm. 128.....	Principles in Business Management.....	3
Acct. 191.....	Business Psychology.....	3
Econ. 121.....	Money and Banking.....	3
Pol. Sc. 112-128.....	Commercial Law.....	6
		30
Group Option (to be selected from one of the following groups).....		15
Electives (to be selected in consultation with the adviser).....		15
Total.....		60

All Business Administration majors must complete the *required* courses listed above. The group options shown below provide specialization in several aspects of business. Selection of the option and the courses (15 credit hours) to be taken in it must be made in consultation with the adviser. Not only no more than 6 credit hours may be taken in an option other than the one selected. Consent of the adviser must be obtained if the student wishes such modification of his option group.

Group I—General Business

The group option is made up of selected courses offered by the departments of Accounting, Business Administration, Economics, and Statistics.

Group II—Personnel Management

The group option is made up of selected courses offered by the departments of Business Administration, Economics, Psychology, Speech, and Statistics.

Group III—Finance

The group option is made up of selected courses offered by the departments of Accounting, Business Administration, Economics, Political Science, and Statistics.

Group IV—Marketing

The group option is made up of selected courses offered by the departments of Business Administration, Economics, Geography, and Statistics.

Group V—Creditability

The group option is made up of selected courses offered by the departments of Accounting, Business Administration, and Economics.

Group VI—Economics

This group option is made up of selected courses offered by the departments of Economics and Business Administration.

Group VII—Statistics

This group option is made up of selected courses offered by the Department of Statistics.

Foreign Commerce—Business Administration majors who wish to specialize in foreign commerce may request a modification of the above requirements. The modified major includes some of the above required courses and adds others, such as a third year of foreign language, foreign markets, exporting and importing, economic geography, and other courses relating to overseas trade. Each program must be approved by the adviser.

Accounting		Credits Hours
Acct. 101	Cost Accounting	3
Acct. 111	Financial Statement Analysis	3
Acct. 121-22	Intermediate Accounting	6
Acct. 132	Accounting Theory	3
Acct. 171	Auditing	3
Acct. 181	Accounting Systems	3
Acct. 191	Business Budgeting	3
Bus. Adm. 102	Business Management	3
Bus. Adm. 131	Business Finance	3
Ecns. 121	Money and Banking	3
Pol. Sc. 147-48	Commercial Law	6

Group Option (1) is selected from one of the following groups—15
Includes (1) to (4) in consultation with the adviser.

Total..... 15

All Accounting majors must complete the required courses listed above. The group option allows students to provide specialization in public accounting, commercial and industrial accounting, and governmental accounting and budgeting. Selection of the major and the courses (15 credit hours) to be taken in it must be made in consultation with the adviser.

Group I—Public Accounting

This group option is made up of selected courses offered by the departments of Accounting, Business Administration, and Political Science.

Group II—Commercial and Industrial Accounting

This group option is made up of selected courses offered by the departments of Accounting, Business Administration, Economics, and Statistics.

Group III—Governmental Accounting and Budgeting

This group option is made up of selected courses offered by the departments of Accounting, Business Administration, Political Science, and Economics.

Business and Economic Statistics

Business and Economic Statistics		Credits Hours
Stat. 111	Business and Economic Statistics I	3
Stat. 112	Business and Economic Statistics II	3
Stat. 117	Analysis of Variance	3

Stat. 118.....	Correlation and the Chi-Square Test.....	3
Stat. 195-96.....	Reading and Research in Business and Economic Statistics.....	6
Bus. Adm. 101.....	Business Organization and Combination.....	3
Bus. Adm. 102.....	Business Management.....	3
Econ. 1-4-2.....	Economic Analysis.....	6
Econ. 1-5.....	Business Cycles.....	3
Phil. 121-22.....	Logic and Scientific Method.....	6
Electives (A).....	(To be selected from Statistics.....)	6
Electives (B).....	(From Accounting, Business Administration, and Economics in consultation with the adviser).....	15
Total.....		60

EXAMINATIONS FOR WAIVING CURRICULUM REQUIREMENTS

A student desiring to omit a required course may take such examination as the department prescribes, and, on passing satisfactorily, he may be relieved of the curriculum requirement in that subject and may qualify for registration in an advanced course. Passing of this examination does not entitle the student to any hours of credit toward the degree. A student desiring to take such examinations should make the request of the Dean and pay the required fee.

GRADUATE RECORD EXAMINATIONS

During the final term of the senior year students in the School of Government are required to take the following Graduate Record Examinations: the Aptitude Test, which provides a measure of general scholastic ability at the graduate level; and Area Tests (achievement), which measure breadth of knowledge and understanding in three broad areas of the liberal arts: Natural Science, Social Science, and the Humanities. (For further information concerning the Graduate Record Examinations, see page 49.)

THE MASTER'S DEGREES

Upon the satisfactory completion of the graduate requirements of the School of Government, one of the following degrees is conferred: (1) Master of Arts in Government with a major in Foreign Affairs, Economic Policy, Accounting, Business and Economic Statistics, Counseling, and Psychometrics; (2) Master of Arts in Public Administration in the fields of General Administration and Governmental Fiscal Administration; (3) Master of Arts in Personnel Administration; (4) Master of Business Administration.

ADMISSION TO CANDIDACY

A student is formally recognized as a candidate for the Master's degree only when his application for candidacy has been approved.

A 3.00 average in the undergraduate major is normally required for admission to graduate study.

The candidate for the Master's degree who is deficient in undergraduate preparation may take a comprehensive examination on his undergraduate major field. Passing of this examination entitles the student to admission without taking specific courses to make up his deficiencies.

In courses taken to satisfy undergraduate deficiencies, the student must maintain at least a 3.00 average to be eligible for admission to graduate study.

Candidates for the Master of Arts degree in Foreign Affairs or in Economic Policy must show a reading knowledge (certified by the appropriate language department) of at least one modern foreign language, to be approved by the Dean. Such examination should be taken before the student begins the second fifteen hours of his work.

REQUIREMENTS FOR THE DEGREES

A minimum of thirty credit hours of work, as outlined in the curricula on pages 186-88, must be completed successfully. Variations from these curricula require the permission of the Dean.

No part of the minimum requirements may be taken in any other institution.

A second-group course (numbered 101-200) may be counted toward the Master's degree only when registration for advanced credit has been approved at the beginning of the course by the Dean and by the officer of instruction, and provided that the student has done such extra work in the course as may be prescribed by the instructor.

All work for the degree of Master of Arts in Government or Master of Business Administration must be completed in three years, unless an extension of time is granted by the Dean's Council. Validation examinations may be required.

In addition to the course examinations, the candidate must pass a comprehensive written examination in his major field. These examinations are scheduled two or more times a year (usually in December and in April), and should be taken shortly before or shortly after the completion of the prescribed course work. The candidate must consult with his adviser, well in advance, as to the date of his examination and the definition of the subject-matter fields which this examination is to cover. An oral examination on his thesis may also be required.

No work counted toward a Bachelor's degree may be counted toward a Master's degree.

A student who expects to continue his studies for the degree of Doctor of Philosophy (Graduate Council) or Doctor of Business Administra-

tion, after receiving the Master's degree, will be assisted in planning his program so that he may qualify for admission to candidacy for the Doctorate.

RESIDENCE

No credit is granted for work done in absentia, i.e., without formal instruction, except for the thesis, which may be completed in absentia with the permission of the department concerned.

SCHOLARSHIP

A student whose scholarship is unsatisfactory may be suspended by the Dean. Grades for graduate work are Excellent, Satisfactory, and Unsatisfactory; for further details, see page 45. A graduate student must have at least six credit hours with the grade of "Excellent" in his completed Master's program.

CURRICULUM REQUIREMENTS

A normal program includes a minimum of twenty-four credit hours of course work and the thesis (six credit hours), to be selected from the courses listed under the chosen major field, and such other courses as may be necessary. Programs should be prepared in advance in consultation with the adviser and submitted to the Dean on the appropriate form; if the program is not completed at the time of registration this must be attended to not later than one month following registration.

THE THESIS

Students who plan to complete work for a Master's degree in one year should register for the thesis at the beginning of the year; otherwise the thesis should be registered for not later than the beginning of the final year. The choice of the thesis subject must be approved by the professor in charge and recorded in the Office of the Registrar by the date announced in the University calendar. The typewritten thesis in its final form must have the approval of the professor in charge and must be presented to the Dean by the student not later than the date announced in the University calendar. Requirements in regard to the form of the thesis are stated on pages 49-50, and additional information will be supplied by the Dean.

Payment of tuition for the thesis entitles the candidate, during the academic year of registration, to the advice and direction of the member of the Faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year is granted without further tuition payment. If the preparation of the thesis extends beyond

the two-year period, it must be registered for again, and tuition paid on the same basis as for a repeated course.

MASTER OF ARTS IN GOVERNMENT

This degree is offered in six different curricula which are described below.

Students who have a special need for integrating courses from two or more of the major fields of concentration for the degree of Master of Arts in Government may request approval, by a faculty committee, of a special major program. All rules and regulations for the degree of Master of Arts in Government will apply to such special programs.

Foreign Affairs

Prerequisite: an undergraduate major in foreign affairs, economics, history, or political science, depending upon the field of specialization. Any course deficiency in foreign affairs must be made up.

The program in Foreign Affairs is offered in four fields of specialization: International Economics, International Politics, International Communications, and Regional Studies.

International Economics.—Graduate courses in economics (numbered 200 and above) in the field of international trade, the balance of payments, international monetary policies, and international economic policies form the principal part of this specialization. Graduate courses in economic theory are recommended. Under courses may be included with the consent of the advisor.

International Politics.—Graduate courses in political science and history (numbered 200 and above), in international law, international politics, international organization, diplomatic history, and American foreign policy, comprise the principal requirements for this specialization. Related courses may be added with the consent of the advisor.

International Communications.—Graduate courses (numbered 200 and above) in political science, psychology, sociology, and geography with 12 hours (consisting of six course works in the fields of public opinion, international relations, psychological warfare, and communications, and 12 hours (consisting of the course works in the fields of international politics and area studies. The advisor in all cases must approve the course selection.

Regional Studies.—Graduate courses in economics, political science, history, and geography (numbered 200 and above) studies with a geographic emphasis, such as Latin America, Europe, the Soviet Union, or the Pacific Area, comprise the principal requirements. Other courses of broader scope in economics, history, and political science are recommended as part of the program. The advisor in all cases must approve such selection.

The listing of advisors is given by these fields, if specialization is given in the Department offerings for Economics, History, Political Science, Geography, Psychology, and Sociology.

ECONOMIC POLICY

Prerequisite: an undergraduate major in economics or the equivalent.

Graduate courses in economics included: Economic Policy—Economics 205 and Recommended course in income and employment, national income, business

of fiscal, monetary and fiscal policy, economic theory, and statistics. These courses and others that may be appropriate are to be selected with the consent of the adviser.

ACCOUNTING

Prerequisite: an undergraduate major in accounting or the equivalent. The program in Accounting requires the following courses:

Acct. 212.....	Managerial Accounting.....	3
Acct. 231.....	Contemporary Accounting Theory.....	3
Acct. 274.....	Accounting Practice.....	3
Acct. 295-96.....	Seminar in Accounting.....	6

The remaining nine hours of course work are to be selected from courses approved by accounting with the approval of the adviser.

BUSINESS AND ECONOMIC STATISTICS

Prerequisite: an undergraduate major in business and economic statistics, or the equivalent; such work must include a minimum of 24 credit hours of group courses in statistics and a minimum of 18 credit hours in second group courses in accounting, business administration, and economics.

The Master of Arts program requires at least 12 credit hours of graduate courses in statistics. The remaining 12 credit hours are to be selected from graduate work offered by the departments of Accounting, Business Administration, Economics, and Statistics with the approval of the adviser.

COUNSELING

Prerequisite: an undergraduate major in psychology, business administration, or education; or an undergraduate degree in the social sciences appropriate to consideration in this field. The undergraduate background should include satisfactory basic training in such fields as psychology, sociology, statistics, labor economics, and business management or public administration.

The Master of Arts program in Counseling requires the following courses:

Psychology 220.....	Seminar: Abnormal Psychology.....	3
Psychology 145.....	Seminar: Mental Hygiene.....	3
Psychology 187.....	Seminar: Counseling and Guidance.....	3
Psychology 189.....	Seminar: Techniques of Counseling.....	3
Psychology 226.....	Seminar: Occupational and Educational Guidance.....	3
Psychology 280.....	Seminar: Analysis of the Individual for Purposes of Counseling.....	3

The remaining nine hours are elective, with the approval of the adviser.

PSYCHOMETRICS

Prerequisite: an undergraduate major in psychology, statistics, or the social sciences which includes twelve credits in psychology (general psychology, measurement, personal psychology, and mental psychology courses); general statistics; mathematics through matrix algebra (specifically through calculus).

The Master of Arts program in Psychometrics requires the following courses

Psychology 231	Test Construction	3
Psychology 234	Seminar: Test Theory	3
Psychology 240	Seminar: Personnel Measurement Techniques	3
Statistics 115	Statistics in Psychology and Education	3
Statistics 117	Analysis of Variance	3
Statistics 118	Correlation and the Chi-Square Test	3
Psychology 299-300	Thesis	6

The remaining six hours are elective, with the approval of the adviser

MASTER OF ARTS IN PUBLIC ADMINISTRATION

The purpose of the program for the degree of Master of Arts in Public Administration is to prepare graduates to enter public service in the field of administration and to advance the professional competence of graduates already in public employment. The major fields are General Administration and Governmental Fiscal Administration.

GENERAL ADMINISTRATION

Prerequisite: an undergraduate background in the social sciences appropriate to specialization in this field.

The program in General Administration requires Political Science 205-26, *Workshop in Public Administration*, and eighteen additional graduate credits to be selected from the following, with the approval of the adviser:

Econ. 226	Problems in Governmental Economic Policy	3
Pol. Sc. 209-10	Seminar: The Federal Government of the United States	6
Pol. Sc. 213	Readings in Comparative Government	3
Pol. Sc. 226	Problems of Governmental Reorganization	3
Pol. Sc. 239-40	Principles and Problems of Personnel Administration	6
Pol. Sc. 241	Human Relations in Administration	3
Pol. Sc. 243	The Supervision of Federal Personnel	3
Pol. Sc. 245	Advanced Organization and Management	3
Pol. Sc. 253	Staff Functions in Government Administration	3
Pol. Sc. 255	Administrative and Organization Theories and Problems	3
Pol. Sc. 256	Public Policy Formulation and Administration	3
Pol. Sc. 258	Public Relations in Government Administration	3
Pol. Sc. 263-64	Analysis of the Administrative Process	6

GOVERNMENTAL FISCAL ADMINISTRATION

Prerequisite: an undergraduate background in the social sciences with emphasis on economics and business administration.

The program in Governmental Fiscal Administration requires Political Science 205-26, *Workshop in Public Administration*, and eighteen additional graduate credits selected from the following, with the approval of the adviser:

Acct. 246.....	Governmental Accounting and Budgeting Problems.....	3
Bus. Adm. 291-92.....	Seminar in Business Management.....	6
Bus. Adm. 297.....	Controlship in the Federal Service.....	3
Bus. Adm. 299.....	Seminar in Controlship.....	3
Econ. 243-24.....	Monetary Policy and Central Banking.....	6
Econ. 261-62.....	Public Finance and Fiscal Policy.....	3
Econ. 263.....	Problems of Governmental Economic Policy.....	3
Pol. Sc. 245.....	Advanced Organization and Management.....	3
Pol. Sc. 251-52.....	Budget Formulation and Execution.....	6
Pol. Sc. 253.....	Staff Functions in Government Administration.....	3
Pol. Sc. 255.....	Administrative and Organizational Theories and Problems.....	3
Pol. Sc. 256.....	Public Policy Formulation and Administration.....	3
Pol. Sc. 258.....	Public Relations in Government Administration.....	3

MASTER OF ARTS IN PERSONNEL ADMINISTRATION

The purpose of the program for the degree of Master of Arts in Personnel Administration is to train graduates in personnel management techniques and problems. While the emphasis is placed on governmental personnel work, the curriculum may be adapted to the interest of graduates who plan a career in personnel relations in business.

Prerequisite: an undergraduate major in the social sciences, business administration, or education, coupled with courses in personnel psychology, social psychology, or abnormal psychology.

The program requires twenty-four graduate credits, in general developed from the following, with the approval of the adviser:

Bus. Adm. 125.....	Personnel Management in Industry.....	3
Bus. Adm. 126.....	Problems in Personnel Management.....	3
Bus. Adm. 291-92.....	Seminar in Business Management.....	6
Econ. 241.....	Labor Economics.....	3
Econ. 244.....	Labor Relations.....	3
Pol. Sc. 239-40.....	Principles and Problems of Personnel Administration.....	6
Psych. 244.....	Seminar: Job Analysis and Evaluation.....	3
Psych. 245.....	Employee Motivation and Morale.....	3
Psych. 246.....	Seminar: Personnel Management Techniques.....	3
Elective.....	(From Business Administration, Economics, Political Science, Psychology).....	6

MASTER OF BUSINESS ADMINISTRATION

This curriculum provides the graduate student with the general and specialized training which will help him advance to responsible positions in business. Business training is also essential for many positions in government service and the program offers such training.

Normally, a student with an acceptable (B average) undergraduate major in Business Administration, or the equivalent, can complete the

work for the Master of Business Administration in one year. All such programs must be approved by the adviser. Students with course deficiencies, but with good academic records, will be admitted to study for the Master of Business Administration and will be required to take up to 60 credit hours of work for this degree. The amount of work over and above 30 credit hours, and the courses to be taken, will be determined by the adviser, with the approval of the Dean.

Graduate course work in Business Administration is listed on pages 241-42. The Master of Business Administration program, with the approval of the adviser, may include certain graduate courses from other departments, such as Economics, Accounting, and Statistics.

DOCTOR OF BUSINESS ADMINISTRATION

The work for this degree is under the supervision of the Committee on Doctoral Studies of the School of Government.

An applicant must have the degree of Master of Business Administration, Master of Arts in Business Administration, or Master of Arts in a related field or the equivalent of such degrees, together with acceptable personal qualities and a capacity for creative scholarship. Each applicant must demonstrate his competence in Statistics and Accounting, either by qualifying examinations or acceptable university credits in these subjects. He must satisfy this requirement in at least one of the two subjects before his application to study for the degree of Doctor of Business Administration will be considered.

After admitting an applicant, the Committee on Doctoral Studies, in consultation with the applicant, will designate six fields of study and appoint an adviser to guide the student in his work in these fields. As part of this work, the student must complete a minimum of thirty credit hours in graduate courses. Additional course work may be prescribed by the adviser.

When the applicant has satisfied his adviser and the Committee of his readiness to take the General Examination, this Examination will be scheduled.

The General Examination is a written comprehensive on fields of study not limited to the subject matter of courses taken in these fields. Two fields of study are required of all applicants: Economic Theory and Business and Economic History. The four additional fields, selected by the Committee and the applicant, will be drawn from the following list: Marketing, Organization and Management, Business Finance and Investments, Personnel Management, Public Administration, Accounting Theory, Money and Banking, Statistics, Risk and Risk Bearing, Trans-

portation and Traffic Management, and such others as the Committee may designate.

Upon successful completion of the General Examination and approval of the subject of the doctoral dissertation, the student may be admitted to candidacy by the Committee on Doctoral Studies. The candidate's research and the preparation of his dissertation are supervised by a Research Adviser designated by the Committee.

The Final Examination of the candidate consists of his oral defense of the dissertation. The examination will be given by a committee appointed by the Committee on Doctoral Studies. Upon successful completion of this oral examination the candidate will be approved for the degree of Doctor of Business Administration by the Committee on Doctoral Studies.

SPECIAL PROGRAMS

The Navy Graduate Comptrollership program, sponsored by the Naval Post Graduate School, provides 40 credit hours of work in comptrollership and related fields for a selected group of Naval and Marine officers. The Master's degree is awarded upon successful completion of this full year program.

In cooperation with the College of General Studies, the School of Government conducts the Air Force Manpower Management Training Program, under the sponsorship of the Department of the Air Force.

The Air Force Advanced Management program, sponsored by the United States Air Force Institute of Technology, provides 40 credit hours of work in advanced management and supporting fields for a selected group of Air Force officers. Most of the officers receive the Master's degree upon successful completion of this full year program.

For another group of officers sponsored by the United States Air Force Institute of Technology, the School of Government offers the graduate curriculum in Military Economics and Politics; this specialized program is also open to qualified civilians, who may enroll with special permission of the Dean.

The School of Government cooperates with the College of General Studies in the off Campus program of that College, particularly in the fields of comptrollership, governmental administration, and personnel administration.

The Department of Business Administration offers work in the field of property and casualty insurance as part of the educational program of the American Institute for Property and Liability Underwriters, Inc.

BUREAU OF BUSINESS AND ECONOMIC RESEARCH

The Bureau, as part of the School of Government, was established to conduct research in both the fields of business and economics. This work is under the direction of the Executive Committee of the Bureau of Business and Economic Research. Special attention is given to problems of the metropolitan area of Washington, D. C. Research projects are also sponsored by public and private agencies. Both faculty and students of the School of Government participate in the activities of the Bureau of Business and Economic Research. Results of research activities as well as abstracts of selected Masters' theses are reproduced and disseminated by the Bureau.

THE COLLEGE OF GENERAL STUDIES

Mitchell Dreese, Ph.D., *Dean of the College of General Studies*

John Francis Latimer, Ph.D., *Assistant Dean of the College of General Studies*

Grover LaMarr Angel, Ed.D., *Director of the Off-Campus Division*

Mary Ellen Coleman, A.M., *Director of the Reading Clinic*

Karl Ernest Stromsem, Ph.D., *Adviser on Government Intern Scholarships*

Leonard Walton Vaughan, A.M., *Director of the George Washington Counseling Center*

THE DEAN'S COUNCIL •

Benjamin Douglass Van Evera

Calvin Darlington Linton

Arlin Rex Johnson

Robert Dale Campbell

Ralph Windsor Ruffner

Haaren Albert Miklofsky

GENERAL INFORMATION

INTRODUCTORY

The College of General Studies of The George Washington University, established in 1950, is designed primarily to supplement the adult education opportunities previously available at the University. It includes the following divisions: (1) the Off-Campus Division; (2) the Campus Division; and (3) the Division of Community Services.

OFF-CAMPUS DIVISION

In recent years, employee in-service training has been increasingly emphasized in government, education, business, and industry. Service personnel in nearby military and naval installations have likewise been increasingly interested in off-duty education as a means of working toward academic degrees and increased professional proficiency. The Off-Campus Division of the College of General Studies works closely with personnel administrators, training officers, school officials, and others interested in developing programs of in-service training and brings the educational resources of the University to bear on such programs. Credit and non-credit courses are organized in any field in which there is sufficient demand and for which instructional facilities can be made avail-

* The President of the University, the Dean of Faculties of the University, the Dean and the Assistant Dean of the College are members ex officio of the Council.

able. These courses meet at the time and place most convenient for the students enrolled and may begin at any time of the year. Credit courses are accepted by any school or college of the University provided (1) the student is accepted for degree candidacy in that school or college; (2) the courses in question are within the scope of the curriculum requirements; and (3) the maximum number of credit hours which can be taken in any school or college of the University other than that in which the student is a degree candidate is not exceeded. Credit courses may also be transferred to other colleges and universities.

Admission to Course Work

Admission to an off-campus course does not constitute admission to degree candidacy or to a campus division of the University.

A simplified procedure for admission and registration in off-campus courses is conducted at or prior to the first meeting of the class. Transcripts of previous academic work are not required. Registration in credit courses is restricted to those whose qualifications indicate that they are able to complete the course successfully. In general, off-campus non-credit courses are open to any individual interested in enrolling. However, when a course is organized at the request of some particular agency or group, admission may be restricted to the students recommended by the sponsoring organization. A limit on the size of classes may have to be imposed in order to maintain the quality of instruction.

Admission to Degree Candidacy

In agencies and service installations where there is sufficient enrollment to permit offering the necessary range of courses, it is possible to earn the Associate in Arts, Bachelor of Arts, or Master of Arts degrees without campus studies. For further information, see the bulletin of the College of General Studies.

CAMPUS DIVISION

This Division has been established in recognition of the fact that there are adults, well qualified to undertake a particular program of college work, whose academic preparation would not ordinarily qualify them for admission to a previously established school or college of the University, without considerable prerequisite work. It is also recognized that an adult, through his work experience, may have gained competency in some particular area of learning. This knowledge may be validated by special examination to entitle him to advanced standing toward a degree. For further information, see the bulletin of the College of General Studies.

DIVISION OF COMMUNITY SERVICES

This Division was organized to provide needed auxiliary educational services and to promote programs designed to supplement the formal educational offerings of the University.

Non-credit courses in a wide variety of subject fields will be set up at the request of any interested group. There will be no entrance requirements. The length of each course will be determined by the wishes of the sponsoring group and the nature of the subject to be studied.

The George Washington University Reading Clinic offers both diagnostic and corrective work for small groups or individuals and reading improvement techniques for small classes. All courses are designed to meet particular individual needs whether on a remedial basis or for accelerated reading comprehension.

The Government Management Intern Scholarship Program offers annually fifty scholarships to assist federal agencies in training carefully selected young men and women for administrative leadership in the government career service. Each scholarship provides a tuition-free course of three credit hours a term and appropriate academic credit (up to six credit hours) for the successful completion of training assignments required in any agency program which has been evaluated by the University.

The George Washington Counseling Center offers counseling programs designed to assist individuals in making vocational and educational plans. The services offered include the following: (1) aid in vocational choice; (2) checking present training objectives; (3) diagnosis of academic difficulties; (4) determining suitability of present job; and (5) assistance in understanding individual's abilities, aptitudes, and interests.

FEES

The tuition fee for off-campus credit courses in other than service installations for service personnel is \$12 per credit hour. Through a contractual relationship with nearby naval and military installations, it has been possible to offer instruction to service personnel in these installations at the reduced tuition rate of \$10 per three credit course. However, in service installations located more than 30 miles from the campus, in order to cover the additional expense of the instructors' travel it is necessary to charge a tuition of \$12 per credit hour. The fees for non-credit courses and eight-week credit courses are payable in full at the first meeting of the course. By special arrangement in fifteen-week credit courses, payments may be made in three equal installments.

THE DIVISION OF UNIVERSITY STUDENTS

Elmer Louis Kayser, Ph.D., LL.D., *Dean of the Division of University Students*

John Gage Allee, Jr., A.M., *Assistant Dean of the Division of University Students*

THE DEAN'S COUNCIL •

Ralph Dale Kennedy

Ira Bowers Hansen

Francis Edgar Johnston

GENERAL INFORMATION

INTRODUCTORY

The Division of University Students was established in 1930. In this Division are registered mature students who wish to undertake University courses for credit either here or elsewhere or as auditors, but who are not at this time working toward degrees in this University.

REGULATIONS

Students in the Division of University Students are subject to, and are expected to familiarize themselves with, the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 12-27; the University regulations stated on pages 44-52; and the regulations concerning PROBATION, SUSPENSION, AND WARNINGS which are the same as those stated on page 62 under the Junior College.

TRANSFER TO REGULAR STATUS

A "University student" may be transferred, at his request, to another college or school of the University only upon complying with the regulations of the specific college or school to which he wishes to transfer. The student should familiarize himself with the regulations printed in the University CATALOGUE concerning admission, residence, amount and quality of work. He should also specifically note the University regulations regarding transfers within the University on pages 46-47, and regarding graduation requirements on pages 48-50, and observe that when a student transfers into a degree granting school or college, to be eligible for a degree he must meet not only all the general graduation requirements, but also such special requirements as may apply in his particular curriculum.

• The President of the University, the Dean of the University, the Dean and the Assistant Dean of the Division of University Students are members of the Council.

THE DIVISION OF SPECIAL STUDENTS

Warren Reed West, Ph.D., *Dean of the Division of Special Students*

THE DEAN'S COUNCIL •

Thelma Hunt

Carl Hugo Walther

Fred Salisbury Tupper

GENERAL INFORMATION

INTRODUCTORY

The Division of Special Students was organized in 1944. To this Division may be admitted students who are in the process of qualifying for degree candidacy. Students in this Division are designated "special students".

REGULATIONS

Students in the Division of Special Students are subject to, and are expected to familiarize themselves with, the regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES stated on pages 12-27; and the University regulations stated on pages 44-52.

SCHOLARSHIP

A student in this Division may be dropped for reasons of scholarship at any time his quality-point index falls below 2.00.

The system of grading and computing scholarship is described in detail on pages 44 and 45.

ACADEMIC SCHEDULE

The schedule of the "special student" is made up of courses required in the curriculum to which he wishes to transfer. The choice of courses must be approved by the Dean. If the student has not completed the language requirements of this curriculum at the time of his admission to the University, he must include three hours of language in each twelve hours of work until this requirement is met. Second- or third-group courses may not be taken unless all first group requirements have been met or are being met concurrently.

Credits earned at other institutions are evaluated at the time of ad-

• The President of the University, the Dean of Faculties of the University, and the Dean of the Division are members ex officio of the Council.

mission to this Division. They are withheld until the Special Student transfers to a degree-granting college or school, when those appropriate to his curriculum are applied toward advanced standing.

In each individual case, the schedule will be reduced when it is deemed advisable.

TRANSFER TO REGULAR STATUS

A "special student" may transfer to a degree-granting college or school of the University when he has satisfactorily completed his program in the Division of Special Students and has met the admission requirements of the college or school to which he wishes to transfer. The student should familiarize himself with regulations printed in the University CATALOGUE concerning admission, residence, amount and quality of work. He should also specifically note the University regulations regarding transfers within the University on pages 46-47 and regarding graduation requirements on pages 48-50, and observe that when a student transfers into a degree-granting school or college, to be eligible for a degree he must meet not only all the general graduation requirements, but also such special requirements as may apply in his particular curriculum.

ADVISORY SYSTEM

Students in the Division of Special Students are expected to consult with an adviser in the Office of the Dean at least once each term. Any student who has a question in regard to his status, or whose grades are below C, or who is in academic difficulty, is urged to make an appointment promptly without waiting for a request from the Dean.

DIVISION OF AIR SCIENCE

Carl Swyter, B.S. in E.E., Colonel, United States Air Force, *Director of Air Science*

COMMITTEE ON MILITARY SERVICE DELAY AND SELECTION FOR THE ADVANCED COURSE *

Willard Alfred DeLano, *Chairman*

Ired Everett Nessell

Calvin Lee Frederick

Harold Robert Henthorne, *Recorder*

GENERAL INFORMATION

INTRODUCTORY

The Air Force Reserve Officers' Training Corps (Air Force ROTC) unit was established at the University in 1951 under authority of Section 4947C, National Defense Act of June 3, 1916, as amended. Air Force Personnel, approved by the President of the University, are detailed by the Department of the Air Force to supervise and instruct the Air Force ROTC cadets.

The mission of the Air Force ROTC program is to select and prepare students through a permanent program of instruction to serve as commissioned officers in the Regular and Reserve components of the United States Air Force. Classroom instruction and leadership training is provided to develop in the student the knowledge and the attributes of character, personality, and leadership required of officers in the United States Air Force. Emphasis is placed on arousing in the student a desire to serve his country as a flying officer.

COURSE OF STUDY

The course of study is divided into a basic course covering the first two years and an advanced course covering the junior year, summer camp, and senior year. Twenty hours of elective credit earned in this program may be applied toward a degree. Two hours a term for the basic course and three hours a term for the advanced course.

The program takes into consideration the fact that many of the advanced subjects in which college students are enrolled have a direct rela-

*The President of the University, the Dean of Faculty of the University, and the Director of the Division are members of this Committee.

tionship to a military career as well as to a civilian career. The courses of the Air Force ROTC program have been carefully selected to supplement those academic subjects. They also afford a means for practical training in organization, leadership, and discipline, which will be of value in industrial or professional careers. The duties and responsibilities of squadron level officers, oral and written expression, and the techniques of problem solving are emphasized throughout the course both in theory and practice. Even those students who are not selected for the advanced course or for commissioning will have received military training of value to the Nation and to themselves.

See "Department of Air Science" for a list of the subjects covered. In addition thereto, orientation flights, simulated flights in Link Trainer, and field trips to Air Force bases are available to selected cadets on a voluntary basis.

ELIGIBILITY REQUIREMENTS

Membership in the Air Force ROTC Unit is open to any regularly enrolled full-time, male student between the ages of 14 and 25, who is a citizen of the United States, physically fit, of good character, and a candidate for a Bachelor's degree. Students who successfully complete the basic course or have equivalent active military training may be selected to enter the advanced course. Students in the advanced course receive from the Government a subsistence allowance of approximately \$500, which is exempt from income tax. During the period of the summer camp the advanced student receives, in addition, \$75 a month, plus food, lodging, and travel expense. Uniforms, textbooks, and training materials are provided for all Air Science courses.

A student enrolling in the basic course must agree to successfully complete the two year course as a prerequisite to graduation from the University. A student applying for enrollment in the advanced courses must, if selected, sign a contract to complete the course as a prerequisite to graduation; attend a four- to six-week summer camp, and fulfill all the obligations conjunctive with military service delay specified below.

MILITARY SERVICE DELAY

Deferment from induction under the Selective Service Act of 1951 may be granted to selected students within authorized quotas. Normally, a student is not considered for draft deferment until he has completed one term's work in the University, with a quality-point index of at least 2.00. A student's deferment is subject to withdrawal if his quality-point index falls below 2.00.

To receive a deferment a student must agree to successfully complete the basic course, if enrolled therein; to complete the advanced course at

the proper time if selected for enrollment therein; to accept a Reserve Commission if tendered; to serve on active duty for a period of not less than three years if called; and to remain a member of a reserve component of the Air Force for eight years from the date of his commission.

It is the student's responsibility to notify his local draft board of this agreement and the termination thereof, as well as to notify the Director of Air Science whenever he intends to transfer to another institution.

STUDENT HONORARY MILITARY SOCIETIES

The Arnold Air Society.—A national honorary military society of Advanced Air Force ROTC cadets established to further the mission, traditions, and concept of the United States Air Force as a means of national defense, to promote American citizenship, and to create a close and more rewarding relationship among the Air Force ROTC cadets. The national organization founded in 1947, was named in honor of the late General of the Air Force Henry Harley Arnold. The local squadron established in 1952, was named in honor of General Carl Spaatz (retired), the first Chief of Staff of the United States Air Force. Only advanced Air Force ROTC cadets are eligible for election to membership. Members are authorized to wear a blue and gold auguilette and ribbon on their cadet uniforms.

Pershing Rifles.—A national honorary military society founded in 1894 by Lieutenant (later General of the Armies) John Joseph Pershing. Its purpose is to encourage, preserve, and develop the highest ideals of the military profession, promote American citizenship, create a closer and more efficient relationship, and provide appropriate recognition of a high degree of cadet achievement. Only basic ROTC cadets are eligible for election to membership. Members are authorized to wear a blue and silver cord and ribbon on their cadet uniforms.

Flying Spawards.—A local women's honorary organization established in 1952 to sponsor Air Force ROTC activities and encourage applications for flying training.

REGULATIONS

Students in the Division of Air Science are subject to and are expected to familiarize themselves with the University regulations stated on pages 12-27 and 44-2, the regulations of the college, school, or division in which enrolled, and the regulations of the United States Air Force pertaining to Air Force ROTC cadets. A copy of Cadet Regulations is issued to each student upon enrollment.

THE SUMMER SESSIONS

Burnice Herman Jarman, A.M., Ed.D., *Director of the Summer Sessions*

DIRECTOR'S COUNCIL.*

Wood Gray

Ira Bowers Hansen

During the summer of 1955 the University offers an eight-week session for undergraduate and graduate students in the Arts and Sciences. The Law School offers work in two six-week sessions. The School of Education offers a special six-week session for teachers, with a pre-session of three weeks and post-session of three weeks.

During the summer of 1955, courses are offered in the Junior College, Columbian College (the senior college), the Law School, the School of Pharmacy, the School of Education, the School of Government, and the College of General Studies.

For a complete statement concerning summer term work, see the Summer Sessions catalogue.

*The President of the University, the Dean of Faculties of the University, the University Senate, and the Board of Trustees are members of the Council.

ADMINISTRATIVE UNITS

HEALTH ADMINISTRATION

Daniel LeRay Borden, A.M., M.D., *University Surgeon, Director*

Charles Joseph Savarese, Jr., A.B., M.D., *University Physician*

Gloria Godbey, A.B., M.D., *Associate University Physician*

Robert Howe Harmon, A.B., M.D., *Associate University Physician*

Ronald Atmore Cox, A.B., M.D., *Associate University Physician (Eye)*

Richard Bernard Castell, A.B., M.D., *Associate University Physician*

Alfred Brigulio, M.D., *Associate University Physician*

Hugh Osgood House, M.D., *Associate University Physician (Nose and Throat)*

Benjamin Franklin Dean, Jr., M.S., M.D., *Associate University Surgeon*

Juanita Pullen Love, R.N., *Nurse-Secretary*

The University maintains a health service that is primarily diagnostic in its intent. For medical emergencies and health consultations there is, on the Campus, a Student Health Clinic open from 9:00 A.M. to 5:00 P.M. with physician and nurse in attendance. There is also a rest room for women, with a graduate nurse in charge.

Medical privileges include: (1) the physical examination of every student entering from secondary school,* (2) three visits by the University physician or surgeon, office or residence (District of Columbia), in any one illness, exclusive of a specialist, surgical operation, laboratory, or X-ray examination; (3) hospitalization, including board and nursing, in the University Hospital for not more than one week during any twelve month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration.

This medical benefit does not apply to illness or disability incurred previous to the University term or prior to payment of tuition fees.

The student is allowed, if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

Rules: (1) The Director of Health Administration is empowered to limit or deny the medical benefits where, in his discretion, a student has, by his misconduct or breach of the rules of the University, made himself ineligible; (2) the Director of Health Administration has authority to determine the necessity and length of hospitalization; (3) a student who has severed his connection with the University is ineligible for

* A charge of \$1.00 a special physical examination is made by the University if a student fails to appear for a physical examination during the period set by this program.

medical benefits; (4) a student intending to train for an athletic team is required to pass a thorough examination at the beginning of each term; (5) the above regulations apply also during the summer term of the University.

The University is not responsible for injuries received in inter-collegiate or intra-mural games, or in any of the activities of the physical education departments.

VETERANS EDUCATION

The George Washington University is approved to provide training for veterans under the provisions of Public Laws 346, 16, 550, and 894. The Office of Veterans Education, 2020 H Street N.W., Building Q, operates as a service bureau for veterans interested in studying at the University and acts in a liaison capacity between the University and the Veterans Administration. Here information may be obtained concerning the educational program of the University and the procedure for securing educational benefits under the GI bills. Veterans residing in the Washington area will often find it to their advantage to seek advice at the Office of Veterans Education before applying to the Veterans Administration for a Certificate.

PUBLIC LAW 346

(World War II GI Bill)

At least thirty days prior to registration the veteran desiring to attend under this GI Bill should apply to Veterans Administration, Veterans Benefits Office, Mentions Building, Twentieth Street at Constitution Avenue, N.W., Washington 25, D.C., for a Certificate of Eligibility and Entitlement, for presentation to the Office of Veterans Education at the time of registration. Veterans who have attended another institution under the GI Bill must obtain a Supplemental Certificate of Eligibility to present to this University.

Attention is invited to the provision of law which prescribes that courses under this GI Bill must be "initiated not later than four years after either the date of discharge or the termination of the present war, whichever is the later". For most veterans this means that the course must have been initiated by July 24, 1951. This deadline date has several important implications for veterans to whom it applies: (1) changes of course or of institution are much more difficult to get approved by the Veterans Administration than formerly; (2) veterans, with few exceptions, will be required to maintain continuity in course by taking at least one subject each fall term and each spring term; and (3) in most cases veterans who withdraw from the University during the fall term, the spring term, or a summer term will be considered to have terminated their courses and thus forfeited further educational benefits. Any veteran who has interrupted his training during a term must secure authorization to reenter from Veterans Administration to be presented at the time of registration.

Veterans already enrolled in the University are requested to consult the Office of Veterans Education prior to making any changes in academic program, because of changes in Veterans Administration regulations concerning Supplemental Certification.

PUBLIC LAW 550
(Korean GI Bill)

In order to be eligible for the benefits under this GI Bill, a veteran must have been in service since June 27, 1950, and must no longer be on active duty. For further information concerning these benefits, it is suggested that he contact the Office of Veterans Education or Veterans Administration, Veterans Benefits Office, Munitions Building, Twentieth Street at Constitution Avenue, NW., Washington 25, D.C.

At least thirty days prior to registration the veteran desiring to attend under this GI Bill should apply to Veterans Administration, Veterans Benefits Office, Munitions Building, Twentieth Street at Constitution Avenue, NW., Washington 25, D.C., for a Certificate for Education and Training, for presentation to the Office of Veterans Education at the time of registration. A photostatic copy of separation papers must accompany the original application for certification.

PUBLIC LAWS 16 AND 894
(Vocational Rehabilitation)

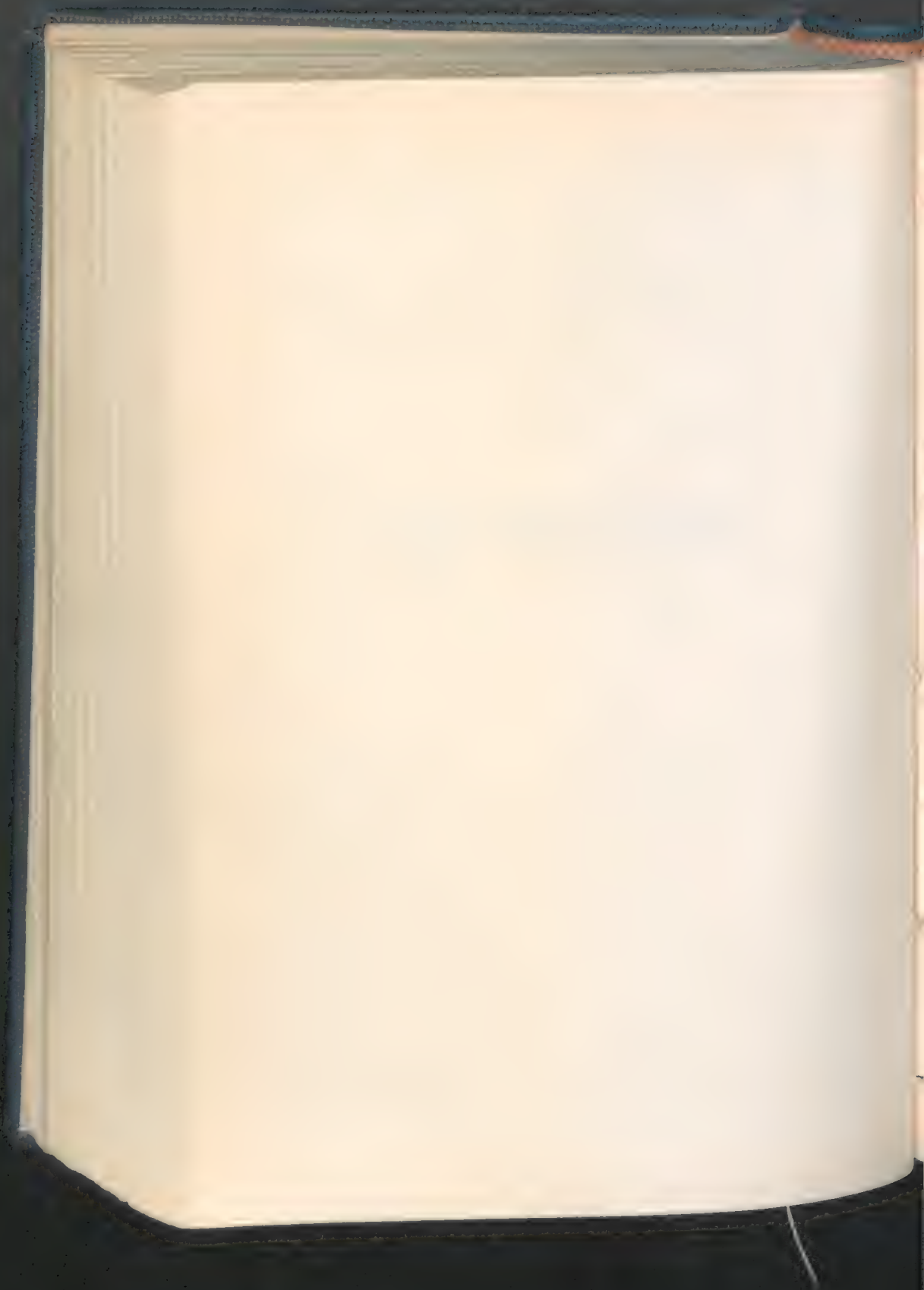
Disabled veterans desiring vocational rehabilitation under either GI Bill should apply to Veterans Administration, Veterans Benefits Office, Munitions Building, Twentieth Street at Constitution Avenue, NW., Washington 25, D.C., for approval of their training objectives at least sixty days prior to registration.

ADMISSION

The entrance requirements for the Junior College, Columbian College, and the School of Government, in other than the pre-professional curricula, have been somewhat modified for veterans who are deficient in the regular requirements for admission, but who have been found by psychological and educational tests able to undertake college work. Veterans who have been enrolled in another educational institution since leaving the service, or who have been out of the service for more than one year prior to the beginning of the term for which they seek admission, must qualify under the regular admissions policies. (For admission requirements and procedure, see pages 12-22.)

Credit for work done in the service schools is granted by the Junior College, Columbian College, the School of Engineering, and the School of Government provided the veteran has not been out of the service for three years or more. To be considered for such credit veterans should submit to the Director of Admissions photostatic copies of their records indicating courses successfully completed with sufficient identification of the course to enable the Admissions Office to locate it in the Guide to Evaluation of Educational Experience in the Armed Forces.

COURSES OF INSTRUCTION



COURSES OF INSTRUCTION

On the following pages of this CATALOGUE, under the alphabetically arranged names of the departments of instruction, are listed the courses of instruction offered by the University in the summer of 1955 and in the academic year 1955-56. The courses as here listed are subject to some slight change. The University reserves the right to withdraw any course announced.

HOURS OF INSTRUCTION

Courses of instruction are scheduled in the morning, afternoon, and evening. Evening classes are identical with daytime sections of corresponding courses, are taught by the same instructors, and carry the same amount of credit. By taking the evening and summer classes and extending the time of study beyond the customary four years, a student who is able to give only part of his time to college work may complete a regular curriculum and obtain a degree.

EXPLANATION OF COURSE NUMBERS

An odd number preceding the name of the course indicates that the course is offered in the fall term; an even number, that it is offered in the spring term; and a double number (187-581), that it begins in the fall term and continues in the spring term. The letter "x" following an odd course number (e.g., 21x) indicates that the course, normally offered in the fall term, is given in the spring term. The letter "x" following an even course number (e.g., 22x) indicates that the course, normally offered in the spring term, is given in the fall term.

In the departments of the School of Medicine, first-year courses are numbered from 101 to 200; second-year courses, from 201 to 300; third-year courses, from 301 to 400; and fourth-year courses, from 401 to 500. This includes courses open to both medical and nonmedical students. Courses limited to nonmedical students follow the numbering system used in "all other schools and colleges" (see below).

In the Law School, first-year courses are numbered from 101 to 200; second-year courses, from 201 to 300; third-year courses, from 301 to 400; and graduate courses, from 401 to 500.

In all other schools and colleges the following system of numbering is used:

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of

the adviser and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be credited toward a higher degree.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be credited toward higher degrees only when registration for graduate credit has been approved at the beginning of the course by the dean responsible for the graduate work and by the officer of instruction, and when the completion of additional work has been certified by the officer of instruction.

Third-group courses.—Courses numbered from 201 to 300 are planned primarily for graduate students. They are open, with the approval of the officer of instruction, to qualified seniors; they are not open to Junior College students or other undergraduates.

INDICATION OF THE AMOUNT OF CREDIT

The number of credit hours given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the name of the course. Thus, a year course giving three hours of credit each term is marked (3-3), and a term course giving three hours of credit is marked (3). A credit hour usually consists of the completion of one fifty minute period of class work or of one laboratory period a week for one term.

A dagger (†) preceding the number of a year course indicates that the course may not be entered in the second term and that credit will not be given until the work of both terms has been completed.

ACCOUNTING

*Ralph Dale Kennedy, Ph.D., *Professor of Accounting, Executive Officer*
Orton Wells Boyd, A.M., C.P.A., *Professorial Lecturer in Accounting*
Edwin Lewis, M.B.A., *Professorial Lecturer in Accounting*
Clarence McLaughlin, B.S., LL.B., *Professorial Lecturer in Accounting*
Forest Carlyle Brinscombe, M.B.A., *Professorial Lecturer in Accounting*

Ira Ernest Steele, A.M., *Professorial Lecturer in Accounting*
James Leonard Buckler, A.M., *Professorial Lecturer in Accounting*
Harold Jerome Bobbs, A.B., C.P.A., *Professorial Lecturer in Accounting*
Fred Vincent Demaret, M.S., *Professorial Lecturer in Accounting*
Henry Alexander Berry, M.B.A., C.P.A., *Professorial Lecturer in Accounting*

Frederick Charles Kartz, B.S. in Com., M.B.A., *Associate Professor of Accounting*

Paul Robert McClenon, M.B.A., C.P.A., *Lecturer in Accounting*

Willard Earle Benson, A.B. in Govt., M.B.A., *Instructor in Accounting*

Associate in Arts (Junior College)—Two-year vocational curriculum in Accounting.—For curriculum, see page 109.

Bachelor of Arts and Master of Arts in Government with a major in Accounting.—School of Government—See pages 172-80, 182, and 184-86, 187.

FIRST GROUP

1-2 *Introductory Accounting* (3-3) The Staff

Study of basic principles underlying accounting records and by simple transactions, debits and credits, and computations; preparation of the book-keeping and financial statements; introduction to cost accounting and its relation to business determination problems. Prerequisite: Accounting 41. Accounting 1 is a component of the program. Meeting and evening sessions. (Also offered 1933 summer term.)

Accounting 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 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- analysis and interpretation of cost data. Prerequisite: Accounting 1-2 Evening. (Also offered 1955 summer term.)
- 111 *Financial Statement Analysis* (3) Kennedy, Steele
Methods and techniques of preparing, analyzing, and interpreting financial statements for the guidance of operating executives, directors, stockholders, and creditors; determination and interpretation of trends and ratios. Prerequisite: Accounting 1-2. Morning. (Also offered 1955 summer term.)
Accounting 111x, same as 111, offered spring term. Evening.
- 121-22 *Intermediate Accounting* (1-1) Benson, Kurtz
Study of valuation and income determination problems; treatment of depreciation, funds, and reserves; accounting for the organization, financing, operation, and dissolution of partnerships and corporations. Prerequisite: Accounting 1-2. Prior course 1-122. Accounting 121. Morning and evening sections.
- 132 *Accounting Theory* (3) Kennedy
Study of the development of basic accounting principles and concepts with special reference to the current thought expressed by the American Institute of Accountants and the American Accounting Association. Prerequisite: six hours of accounting. Morning. (Also offered 1955 summer term.)
- 141 *Governmental Accounting* (3)
Problems relating to governmental appropriation accounts, encumbrances, and fund accounting. Emphasis placed on municipal and state government accounting with an introduction to federal accounting. Prerequisite: Accounting 1-2 or permission of the instructor. Evening.
- 142 *Federal Accounting* (3)
Accounting problems and reports of the Federal Government. Prerequisite: Accounting 141 or permission of the instructor. Evening.
- 151 *Governmental Budgeting—Formulation and Adaptation* (3) Buckler
Study of the development of budgetary theory and current techniques, procedures, and problems relating to the formulation and adoption of municipal, state, and federal government budgets. Evening.
- 152 *Governmental Budgeting—Administration* (3) Buckler
Theory, practices, procedures, and problems involved in the evaluation and administration of budgeted programs for municipal, state, and federal government. Prerequisite: Accounting 151 or permission of the instructor. Evening.
- 161 *Business Taxation* (3) Boyd, Bobys, McLaughlin
A managerial approach to the impact of federal taxation upon the organization, reorganization, financing, and operation of business enterprises; difference between tax accounting and financial accounting; personal funds. Prerequisite: Accounting 1-2. Morning and evening sections.

- 162 *Federal Tax Practice* (3) Boyd, McLaughlin
The professional accountant's practice of federal taxation, including the income tax and estate and gift taxes; preparation of returns, assessment, collection, and refund procedures; use of the tax services. Prerequisite: Accounting 161 or permission of the instructor. Evening.
- 171 *Auditing* (3) Berry
Study of the duties and responsibilities of auditors, principles and procedures of making audits, the techniques of verifying cash financial statement items, and the preparation of audit working papers and reports. Prerequisite: Accounting 121-22. Evening.
- 181 *Accounting Systems* (3) Lewis
Theory and procedure of designing and installing accounting systems for collecting, recording, analyzing, and presenting accounting data. Prerequisite: Accounting 161, 122, and 171, or permission of the instructor. Evening.
- 191 *Advanced Accounting* (3) Korte
Intensive study of consolidated statements, statement of affairs, revaluation, and liquidation reports, and estate and trust accounting. Prerequisite: Accounting 121-22. Evening.
- 193 *Business Budgeting* (3) ———, Brinnacombe (formerly 155)
Study of the principles, techniques, and procedures involved in the development, installation, and operation of a system of budgetary control to aid in the management of private organizations. Prerequisite: Accounting 1-2. Morning. (Also offered 1955 summer term as Accounting 155.)
Accounting 191x, same as 193, offered spring term. Evening.
- 194 *Business Budgeting—Practice and Problems* (3) Buckler
Practical application of budget principles and techniques and an advanced study of the problems involved in general budgetary administration for management control purposes. Prerequisite: Accounting 193 or the permission of the instructor. Evening.
- 198 *Professional Accounting Review* (3) Lewis
Review and coordination of the principles and techniques developed in the accounting curriculum, in preparation both for general practice in the field of accountancy and for professional accounting examinations. Prerequisite: Accounting 161, 141, 162, 171, and 191, or permission of the instructor. Evening.

THIRD GROUP

- 202 *Advanced Cost Accounting* (3) Kurtz
Study of advanced cost accounting theory and problems with emphasis on development and analysis of standard costs, the use of cost data for managerial control, and distribution cost accounting. Prerequisite: Accounting 161 or permission of the instructor. Evening.
- 212 *Managerial Accounting* (3) (formerly 211) Kennedy
Study of the accounting system with special reference to the use of financial and operating records as a tool of management; emphasis is

- placed on non-schedule internal accounting control, accounting reports, and the use of tickets and cost data in directing and controlling the business. Prerequisite: two courses of accounting or the permission of the instructor. (Not offered in 1955-56.)
- 231 *Contemporary Accounting Theory* (3) Kennedy
An intensive study of advanced accounting principles and concepts and of recent theories in connection with the variation of costs and the determination of income. Prerequisite: equivalent hours of Accounting or permission of the instructor. (Not offered in 1955-56.)
- 241 *Governmental Accounting and Budgeting Problems* (3) Lewis
Advanced principles and practice in federal government's relationship to general policy and administration. Prerequisite: Accounting 171 and 182, or permission of the instructor. (Not offered in 1955-56.)
- 272 *Auditing Practice* (3) Berry
Preparation of an audit report, accounting statements as related with Securities and Exchange Commission (SEC) requirements of auditing methods and control. Prerequisite: Accounting 171 or permission of the instructor. Evening.
- 275 *Internal Control and Auditing* (3) Kennedy
Study of internal accounting controls, review and criticism of accounting systems and comparative study and evaluation of managerial practices with respect to their effectiveness and control systems. Emphasis is placed upon the use of internal control and auditing as an aid to management. Prerequisite: Accounting 171 or permission of the instructor. Evening.
- 295-96 *Seminar in Accounting* (3-3) Kennedy
Study, investigation, and discussion of current accounting research topics and problems; individual oral and written reports. Admission by permission of the instructor. Evening.
- 299-300 *Thesis* (3-3) The Staff
Time to be arranged. (Also offered 1955 present term.)

COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above, the University offers the following courses especially for students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, Military Economics and Politics Program, and Engineering Administration.

- 201 *Cost Accounting* (3)
202 *General Accounting* (3)
211-12 *Managerial Accounting* (3-3)
221 *Governmental Budgeting* (1)
275 *Internal Control and Auditing* (3)

AIR SCIENCE

Carl Switzer, B.S. in E.E., Colonel, United States Air Force, *Professor of Air Science, Executive Officer*

Willard Alfred De Lano, Ed.M., Major, United States Air Force, *Assistant Professor of Air Science*

Calvin Lee Frederick, Captain, United States Air Force, *Assistant Professor of Air Science*

Lowell William Frederick, B.S., Captain, United States Air Force, *Assistant Professor of Air Science*

Hatchel Robert Henthorne, A.B., First Lieutenant, United States Air Force, *Assistant Professor of Air Science*

Clarence William Voth, Master Sergeant, United States Air Force, *Instructor in Air Science*

Edgar Frank Anten, Master Sergeant, United States Air Force, *Instructor in Air Science*

James Mitar Miklovich, Master Sergeant, United States Air Force, *Instructor in Air Science*

Herman Albert Muellerschoen, B.S., Ed.M., Technical Sergeant, United States Air Force, *Instructor in Air Science*

Training Certificate—This certificate is awarded upon satisfactory completion of the basic Air Force ROTC course of instruction. Upon presentation of this certificate, eligible candidates may be accepted for commission in the Air Force Reserve in the grade of Airman 2d Class.

Commission in the United States Air Force Reserve—Candidates are awarded a cadet's status and upon the satisfactory completion of the Air Force ROTC course of instruction provided by law and regulations, the graduate may, if qualified, be accepted Second Lieutenant, United States Air Force Reserve.

FIRST GROUP

1-2 *Air Science I—Freshman Year (2-2)* The Staff
Introduction to aviation; fundamentals of global geography; aeronautical concepts and security organizations; technical instruments of military science; rifle and basic military training. Three hours a week. Morning and afternoon sessions.

51-52 *Air Science II—Sophomore Year (2-2)* The Staff
Introduction to aerial warfare; targets, weapons, aircraft, bases, bases, reports to the United States Air Force, and including laboratory exercises under pre-arranged effect training. Prerequisite: Air Science 1-2 or equivalent course military training. Three hours a week. Morning and afternoon sessions.

SECOND GROUP

- 101-2 *Air Science III—Junior Year (3-3)* The Staff
 The Air Force Commander and his Staff, creative problem solving, communication in the Air Force, instructing in the Air Force, military justice, air navigation, weather, Air Force base functions, and leadership laboratory covering cadet flight and squadron and group officer training. Prerequisite: Air Science 51-52 or equivalent active military training and selection by a board of University and Air Force officials. Five hours a week. Morning and afternoon sections.
- 103 *Summer Camp—Between Junior and Senior Years (required)* The Staff
 Attendance at a four- to six-week Air Force ROTC summer camp at an active Air Force base within the continental United States is mandatory between the junior and senior years. The program consists of familiarization flying, physical training, individual weapons, Air Force base activity and equipment, field exercises, air base problems, and leadership training. Prerequisite: Air Science 1-1-2.
 Summer term 1945
- 151-52 *Air Science IV—Senior Year (3-3)* The Staff
 Leadership and management seminar; military aviation and the evolution of warfare, military aspects of world political geography; briefing for commissioned service; and leadership laboratory covering instruction of subordinates, planning and supervising drill, and other cadet corps activities. Prerequisite: Air Science 101-2 and Summer Camp (Air Science 103). Five hours a week. Morning and afternoon sections.

ANATOMY

Ira Rockwood Telford, Ph.D., *Professor of Anatomy, Executive Officer*
 Webb Edward Haymaker, M.D., M.S., *Professorial Lecturer in Anat*

9223

Paul Calabrese, A.M., *Associate Professor of Anatomy*

Corrall Fred Hungerford, Ph.D., *Assistant Professor of Anatomy*

Frank Duane Allan, Ph.D., *Assistant Professor of Anatomy*

Thomas Nick Johnson, Ph.D., *Assistant Professor of Anatomy*

Wilfred Walter Eastman, B.S., M.D., *Clinical Instructor in Anatomy*

Lloyd Eugene Church, D.D.S., M.S., *Clinical Instructor in Anatomy*

Raymond Nathan Brown, M.D., *Clinical Instructor in Anatomy*

Lytle Westley Williams, A.B., M.D., *Clinical Instructor in Anatomy*

Master of Science in the field of Anatomy (Columbia College)—Prerequisite: a Bachelor of Arts or Bachelor of Science degree from this University, or the equivalent, with a major in Biology, Chemistry, or Zoology. The undergraduate program must include the following courses, or the equivalent: Chemistry 14-15, 21, 151-52; Physics 6, 7; Zoology 1-2, 41-42. Biochemistry 241-22 is recommended as an elective.

Required: the general requirement, as stated on pages 87-87. The thirty units of graduate work must include ANATOMY 203, 204, 205, 221-22, 265 or 267-268, and graduate courses in biochemistry, physiology, or related disciplines, with the approval of the Department. It is not always possible to complete courses and research so that the student can be awarded a dissertation in the required work in one academic year.

Doctor of Philosophy (Graduate Catalog)—See page 91

101-2 *Gross Anatomy*

Hungerford and Staff

Regional dissection of the human body, supplemented with lectures and quiz sections. Study of X-ray anatomy to emphasize the functional aspects of the position, shape, and relation of the viscera and skeletal components. Eighteen hours a week, fall term; nine hours a week, spring term.

103 *Human Embryology*

Allan and Staff

The origin and development of the human body. Special emphasis on the value of embryology in interpreting anatomical anomalies and variations as seen in gross dissection, surgery, histology, and pathology. Three hours a week.

104 *Neuroanatomy*

Johnson and Staff

The macroscopic and microscopic study of the central nervous system and the special sense organs. Emphasis on such dynamic aspects as development, pathways, lesions, etc. Six hours a week.

- 105 *Microscopic Anatomy* Telford and Staff
Study of the detailed minute structure of cells, tissues, and organs of the human body, with emphasis on the relation of structure to function. Recognition and interpretation of histological sections related by practical examinations. Six hours a week.
- 201-2 *Gross Anatomy (8-6)* Hungerford and Staff
For qualified non-medical graduate students. Same as Anatomy 101-2. Anatomy 201—laboratory fee, \$20; Anatomy 202—laboratory fee, \$15. Time to be arranged.
- 203 *Human Embryology (2)* Allan and Staff
For qualified non-medical graduate students. Same as Anatomy 103. Laboratory fee, \$7. Time to be arranged.
- 204 *Neuroanatomy (4)* Johnson and Staff
For qualified non-medical graduate students. Same as Anatomy 104. Laboratory fee, \$12. Time to be arranged.
- 205 *Microscopic Anatomy (4)* Telford and Staff
For qualified non-medical graduate students. Same as Anatomy 105. Laboratory fee, \$12. Time to be arranged.
- 221-22 *Seminar (1-1)* The Staff
Reports and discussion of special topics by the Staff and graduate students. For graduate liberal arts students. Regular medical students are encouraged to attend. One hour a week. Time to be arranged.
- 295-96 *Research (arr.)* The Staff
Time, credits, and fees to be arranged.
- 299-300 *Thesis (3-3)* The Staff

ANESTHESIOLOGY

Charles Seymour Coakley, M.D., *Professor of Anesthesiology, Executive Officer*

Donald Harrison Stubbs, A.M., M.D., *Clinical Professor of Anesthesiology*

Seymour Alpert, A.B., M.D., *Associate Professor of Anesthesiology*

Salomon Naphtali Albert, A.B., M.D., D.A., *Clinical Instructor in Anesthesiology*

Cunningham Ramsey MacCordy, M.D., *Instructor in Anesthesiology*

William Elfrige Buzant, M.D., *Clinical Instructor in Anesthesiology*

Allen Wydoma, M.D., *Clinical Instructor in Anesthesiology*

110 *Anesthesiology*

The Staff

Review of basic sciences, correlation between basic sciences and clinical work. One hour a week.

411-22 *Anesthesia Seminar*

The Staff

Students attend anesthesia seminars during their surgical (clinical) clerkships. One hour a week. University Hospital.

411-34 *Advanced Anesthesiology*

The Staff

Students are trained through the work of the department for a period of one week and assigned to work in the operating rooms and to attend conferences and seminars. For the more advanced students a three-week rotation is offered.

ART

Norris Ingersoll Crandall, M.Arch., *Professor of Art*
 Donald Chetoweth Kline, B.Arch., M.J.A., *Professor of Art, Executive Officer*
 Grose Evans, B.F.A., Ph.D., *Lecturer in Art*

STAFF IN THE CORCORAN SCHOOL OF ART

DRAWING AND PAINTING: Richard Luley, Principal; Edmund Arnold, Jonathan Schuman, John Lewis
 SCULPTURE AND CARVING: Heide Winkler
 COMMERCIAL ART: Edward Forrest Walton

Bachelor of Arts (Columbian College)—Departmental:

The major in Art Appreciation—Prerequisite: the Arts and Letters curriculum in the Junior College, or the equivalent, including Art 11-12; see page 61.

Required, in addition to the general requirements stated on pages 77-83, Art 121-22, six hours selected from Art 141-42, 151-52, and eighteen hours chosen from among the following courses: Art 53-60, 71-72, 75-76, 141-42, 143, 146.

The major in Drawing and Painting—Prerequisite: the Arts and Letters curriculum in the Junior College, or the equivalent, including six credit hours selected from Art 11-12, and 71-72.

Required, in addition to the general requirements stated on pages 77-83, Art 121-22, six hours selected from Art 143, 146, and 151-52; and twenty-four credit hours in drawing and painting. Classes in drawing and painting, sculpture, and commercial art are held at the Corcoran School of Art.

Bachelor of Arts in Education with a teaching field in Art (School of Education)—Prerequisite: the Education curriculum, pages 93-94.

Required: the Art option, page 158, and professional courses listed on page 164.

FIRST GROUP

11-12 *Art Appreciation (3-3)*

Meaning of art in historic periods; criticism of works from prehistoric times to the present; symbolism of lines, light values, color, composition form. Morning and evening sections. Crandall

13-16 *Drawing and Painting—Life, Still Life, and Portrait (3-3)*

For beginners. Afternoon. The Staff

17-18 *Drawing and Painting—Life and Portrait (1-1)*

For beginners. Morning, afternoon, and evening sections. Archer

- 71-72 *Introduction to the Arts in America* (3-3) Kline
Painting, sculpture, architecture, furniture, and the popular arts from the colonial beginnings to the present. Morning and evening sections. (Also offered 1955 summer term.)
- 75-76 *Drawing and Painting—Life, Still Life, and Portrait* (3-3) The Staff
Afternoon.
- 77-78 *Drawing and Painting—Life, Still Life, and Portrait* (6-6) Solomon
Morning and afternoon sections.

SECOND GROUP

- 1-1-2 *The Design of the Home* (3-3) Crandall
The home: history, personality, location, cost, financing, maintenance, structure, light, and color. Afternoon.
- 101-122 *World History of Art* (3-3) Kline
The fine arts from ancient times to the nineteenth century. 1955-56 and alternate years, evening; 1956-57 and alternate years, afternoon.
- 141-142 *Interior Decoration* (3-3) Kline
Principles of decoration dealing with furniture, materials of the back-ground, draperies, lighting, and a study of the contemporary house for family living. 1956-57 and alternate years.
- 143 *Folk Arts of America* (3-3) Kline
Woodcarving, painting, ceramics, glass, furniture, and more. Afternoon.
- 146 *Art of the Far East* (3-3) Kline
The architecture, painting, and sculpture of China and Japan. Afternoon.
- 151-152 *Modern Art* (3-3) Evans
From neoclassicism to abstraction and surrealism in painting, and a related study of modern sculpture and architecture. Morning.
- 161-162 *History of Art Criticism* (3-3) Crandall
A survey of art criticism from ancient Greece to the present. (Not offered in 1955-56.)
- 173-176 *Drawing and Painting—Life and Portrait* (6-6) Lahey, Lewis
(6-6)
Morning, afternoon, and evening sections.
- 175-176 *Drawing and Painting—Life and Portrait* (6-6) Lewis
Afternoon.
- 179-80 *Sculpture* (6-6) Warneke
Personal life modeling and composition in clay, plaster and wood carving. Afternoon and evening sections.

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| 181-82 | <i>Design and Commercial Art (3-3)</i> | The Staff |
| | Prerequisite: Art 75-79. Afternoon. | |
| 183-84 | <i>Commercial Art (6-6)</i> | Walton |
| | Illustration, creative art, lettering, fashion design, and merchandise drawing. Prerequisite: Art 75 or that equivalent. Afternoon and evening sections. | |
| 185-86 | <i>Advanced Commercial Art (arr.)</i> | Walton |
| | Time and credit to be arranged. | |

BACTERIOLOGY, HYGIENE, AND PREVENTIVE MEDICINE

Leland Wilbur Parr, Ph.D., *Professor of Bacteriology, Executive Officer*
 Angus MacIvor Griffin, Ph.D., *Professor of Bacteriology*
 Ralph Gregory Beachley, M.D., Dr.P.H., *Adjunct Professor of Public
 Health Practice*
 Mary Louise Robbins, Ph.D., *Associate Professor of Bacteriology*
 William Gray McCarten, M.S., *Assistant Professor of Bacteriology*
 Rudolph Hugh, Ph.D., *Assistant Research Professor of Bacteriology*
 Charles Francis McCaffrey, M.D., *Clinical Instructor in Preventive
 Medicine and Public Health*

SPECIAL LECTURERS

Chester Wilson Emmons, Ph.D., *Chief, Medical Mycology Unit, Labo-
 ratory of Infectious Diseases, National Microbiological Institute,
 National Institutes of Health; Medical Mycology*
 Willard Hall Wright, D.V.M., Ph.D., *Chief, Laboratory of Tropical
 Diseases, National Microbiological Institute, National Institutes
 of Health; Medical Zoology*
 John Roderick Heller, Jr., B.S., M.D., *Director, National Cancer In-
 stitute, National Institutes of Health; Cancer Control*
 Robert Carter Cook, *Director, Population Reference Bureau; Editor,
 Journal of Heredity; Medical Genetics*
 Robert Hanna Felix, M.D., M.P.H., *Director, National Institute of
 Mental Health, National Institutes of Health; Mental Hygiene*
 Frank Byron Colburn, Ph.D., M.D., *Head, Virology Division, Naval
 Medical Research Institute, Naval Medical Center; Virology*
 Edward Kravitz Fackhouse, B.S., *Executive Secretary, District of
 Columbia Tuberculosis Association, Community Health Resources*
 Samuel Jacob Ash, Ph.D., *Chief, Microbiological Chemistry, Depart-
 ment of Bacteriology, Army Medical Service Graduate School;
 Microbiological Chemistry*
 Sarah Bishop Brooks, R.N., B.S. in P.H.N., *Director, Division of Public
 Health Nursing, Arlington County Health Department; Public
 Health Practice*
 Martin Marc Cummings, B.S., M.D., *Chief, Research and Education
 Service, Department of Medicine and Surgery, Veterans Admin-
 istration; Medical Bacteriology*
*Master of Arts or Master of Science in the field of Bacteriology (Columbia
 College)—Prerequisite: a Bachelor of Arts or a Bachelor of Science degree, re-*

spectively, from this University, or the equivalent, with a major in Biology, Botany, Chemistry, or Zoology. The undergraduate program must include the following courses or the equivalent: Chemistry 11-12, 21, 151-52; Physics 6, 7; Zoology 1-2, 41-42.

Required: the general requirements as stated on pages 84-87. The thirty credit hours must include Bacteriology 209, 210, 219-24, 295-96, 299-300. The remaining courses are to be selected from Bacteriology 219-20, 229, 230, 232, 240 and Biochemistry 221-22 (if not presented for admission). The student with microbiological background may substitute for credit one course from the following: cytology, genetics, cell physiology, entomology, histology, biostatistics, and protozoa. It is not always possible to arrange courses and research so that the student can be assured of completing all required work in one academic year.

Doctor of Philosophy (Graduate Council)—See page 91

112 General Bacteriology (4)

For nonmedical students. A study of the fundamentals of bacteriology, including systemic applications. Methods of cultivation and control of several groups of microorganisms are studied in the laboratory. Prerequisite: any biological laboratory science, Chemistry 11-12. Laboratory fee, \$12. Mon., Wed., and Fri., 2:12 to 4:12 p.m.

Robbins

209 Medical Microbiology (1-11)

Bacteria, rickettsia, viruses, yeasts, molds, protozoa, and metazoa which relate to the health and diseases of man—cultural study of most important forms, methods of diagnosis by microscopic, cultural, immunologic, and animal reactions, theory and methods of immunology, vaccines, serums, antibiotics. Open to suitably prepared graduate students, may be elected as a whole or in part by adding the appropriate letter to the course number, with credit allocated as follows: (a) Bacteriology, including rickettsia and viruses—lecture (4), laboratory (13); (b) Parasitology, including medical mycology—lecture (2), laboratory (1), 101 Immunology (11). May be taken by a limited number of candidates for Master's degrees. Laboratory fee, \$4 for each credit hour of laboratory work. Time to be arranged.

Parr, Griffin

210 Fundamentals of Epidemiology and Public Health (2)

Sources, modes, and implications of infection and injury. Consideration also given the problems of accidents and industrial medicine. Open to liberal arts graduate students. Prerequisite: Bacteriology 112 or 209. Mon., 2:30 to 4:30 p.m.

Parr and Staff

219-20 Advanced Microbiology (arr.)

Special study of advanced methods and current problems in microbiology for suitably qualified students specializing in microbiology. Prerequisite: Bacteriology 112 or 209. Chemistry 151-52 or the equivalent, permission of the instructor. Laboratory fee, \$4 a credit hour. Time and credits to be arranged.

Griffin and Staff

229 Virology (6)

Study of viruses and rickettsiae. Lectures and laboratory exercises. For liberal arts graduate students. Prerequisite: Bacteriology 112 or 209 and permission of the instructor. Laboratory fee, \$15. 1956-57 and alternate years. Time to be arranged.

Robbins

- 230 *Statistics in Microbiology* (3) Griffin
The application of statistical methods to the problems of microbiology. For liberal arts graduate students. Prerequisite: entrance or elementary college algebra. 1955-56 and alternate years. Time to be arranged.
- 232 *Immunological Methods* (3) McCarter
Preparation and testing of serological reactions. Demonstration of basic serological phenomena. For liberal arts graduate students. Prerequisite: Bacteriology 112 or 229 and permission of the instructor. Laboratory fee, \$1. 1955-56 and alternate years.
- 245 *Advanced Epidemiology and Public Health* (3) Part
Conferences, readings, and problems for graduate students dealing with specialized and advanced phases of the topics presented in Bacteriology 212. Prerequisite: Bacteriology 112. 1955-56 and alternate years. Time to be arranged.
- 293-94 *Staff Seminar* (1-1) The Staff
For liberal arts graduate students. Bi-weekly throughout the year. Time to be arranged.
- 295-96 *Research in Bacteriology* (1011) The Staff
Time and credits to be arranged.
- 299-300 *Thesis* (3-3) The Staff
- 340 *Health Resources Survey* Beachley and Staff
A survey of complete medical care from first contact, through laboratory and clinical diagnosis, adequate medical or surgical treatment to full funds and community rehabilitation. Case histories assigned under guidance with the cooperation and assistance of the clinical departments. Comparison is to be made between care in ungraded facilities and care in facilities where the student might begin his practice. Emphasis is on coordination of the private practice of medicine and community public health and welfare activities, both tax supported and voluntary. Throughout the didactic point of view is assumed. One hour a week for three weeks and independent research during summer.
- 401 *Public Health Practice* Beachley and Staff
Study of public health practice at national, state, city, and county levels. Public and private agencies. One hour a week for eight weeks.

BIOCHEMISTRY

Joseph Hiram Roe, Ph.D., *Professor of Biochemistry, Executive Officer*
 Carleton Raymond Treadwell, Ph.D., *Professor of Biochemistry*
 William Henry Sebrell, Jr., M.D., *Professorial Lecturer on Nutrition*
 Bernard Leonard Horecker, Ph.D., *Professorial Lecturer on Enzymes*
 William Robert Carroll, Ph.D., *Professorial Lecturer on Proteins*
 Benjamin Williams Smith, Ph.D., *Assistant Professor of Biochemistry*
 Robert Allen Clayton, Ph.D., *Assistant Professor of Biochemistry*
 Klaus Schwarz, M.D., *Associate in Biochemistry*
 Harold William Clark, Jr., Ph.D., *Associate in Biochemistry*
 Norman Philip Goldstein, A.M., M.D., *Associate in Biochemistry*

Master of Arts or Master of Science in the field of Biochemistry (Columbia College)—Prerequisite: a Bachelor of Arts or a Bachelor of Science degree. The undergraduate program must have included the following courses, or the equivalent: Chemistry 11-12, 21, 22, 151-52, Physics 6 and 7, Zoology 1-2 or Biology 1-2.

Required: the general requirements as stated on pages 84-87. The first semester hours must include Biochemistry 221-22, 225-26, 227-28, 229-30. The remaining courses are to be selected from Biochemistry 232, 251, 271, 273, 295-96, 4-6, or, with the approval of the adviser, from equivalent courses in Botany, Chemistry, Physics, or Pharmacology. It is usually not possible to arrange courses and research so that the student can be assured of completing all of the required work in one academic year.

Degree in Philosophy (Graduate Council)—See page 92

113-14 *Biochemistry*

Physiological and medical chemistry. Two lectures, one conference hour and two three-hour laboratory periods a week. Roe and Staff

221-22 *Biochemistry (4-4)*

A lecture and laboratory course for premedical students. Prerequisite: Chemistry 21 and 52. Material fee, \$14 a term. Two and Three hour or 12:00 A.M. and 1:00 to 2:00 P.M. Treadwell

224 *Biochemistry of the Enzymes (1)*

Lecture course dealing with the biochemistry of the enzymes and enzyme reactions. Prerequisite: Biochemistry 113 or 221. Material fee, \$14 a term. Horecker

225-26 *Biochemical Procedures (3-3)*

For those with graduate students. Material fee, \$15 a term. To be arranged. Smith, Clayton

227-28 *Biochemistry Seminar (1-1)*

The current literature in the field of biochemistry, mainly for graduate students, but open to a limited number of specially qualified medical students. Fee, 4.00 P.M. Roe

- 252 *Proteins and Amino Acids* (1) Carrell
A lecture course for Medical and graduate students. Prerequisite: Biochemistry 113 or 241. Wed., 5:00 P.M.
- 253 *Carbohydrate Metabolism* (1) Roe
A lecture course. Prerequisite: Biochemistry 114 or 222. 1956-57 and alternate years. Sat., 9:00 A.M.
- 261 *Biochemistry of the Lipids* (1) Treadwell
A lecture course. Prerequisite: Biochemistry 114 or 222. 1955-56 and alternate years.
- 271 *Advanced Carbohydrate Chemistry* (1) Clayton
A lecture course. Prerequisite: Biochemistry 114 or 222. 1955-56 and alternate years. Wed., 5:00 P.M.
- 275-276 *Research in Biochemistry* (att.) Roe, Treadwell
Time and credits to be arranged.
- 277-300 *Thesis* (1-3) Roe, Treadwell
- 4-4 *Applied Nutrition* (1) Sehnell
For senior medical students and graduate students. Lecture course with laboratory components. Deficiency, honors, and therapeutic diets. Prerequisite: Biochemistry 113 or 241. Sat., 9:00 A.M.

BIOLOGY*

†Paul William Bowman, Ph.D., *Professor of Biology, Executive Officer*
 Sam Clark Munson, Ph.D., *Associate Professor of Biology*
 Robert Carter Cook, *Lecturer on Genetics*

Bachelor of Arts or Bachelor of Science with a major in Biology (Columbia College—Field of Study I)—Prerequisite: the Arts and Letters or the Science curriculum, respectively, in the Junior College; see pages 64-65.

Required: the general requirements as stated on pages 77-81 and the grade of "pass" on the Biology major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes the classification and the histories of plants and animals, ecology, geology, evolution, heredity, the physical and cultural development of man, public health problems, and the history of biology. The course offerings will be correlated and supplemented by supervised study in a seminar. For further details, see the pamphlet, which is available at the Office of the Dean of Columbia College.

Master of Arts or Master of Science in the field of Biology (Columbia College)—Prerequisite: a Bachelor of Arts or Bachelor of Science degree, respectively, with a major in Biology at this University, or the equivalent.

Required: the general requirements as stated on pages 84-87.

Bachelor of Arts in Education with a teaching field in Biology (School of Education)—Prerequisite: the Education curriculum, pages 65-66.

Required: the Biology option, page 158, and the professional courses listed on page 164.

Doctor of Philosophy (Graduate Council)—See page 92.

FIRST GROUP

1-2 Survey in Biology (3-3)

Systematic study of the plant and animal kingdoms, with emphasis upon the interdependence of living things and their relations with their environments. Introduction to evolution, heredity, public health, and conservation. Material fee, \$6 a term. Lecture, laboratory, and field trip to nearby countryside, museums, and other places of biological interest. Morning, afternoon, and evening sections. (Also offered 1955 summer term.)

Munson

SECOND GROUP

115X-10 Cytology (3-3)

Study of plant and animal cells and their components, including the chromosomes and their role in heredity, with training in the preparation of materials for study. Prerequisite: one year of college work in biology, botany, or zoology. Material fee, \$7 a term. Lecture, recitation, and laboratory. Biology 115X offered spring term. (Biology 116 not offered in 1955-56.)

Bowman

* See also departments of Botany and Zoology.
 † On contract basis, leave fall term only.

127 *Genetics* (3)

Cock

A lecture course in which the general principles are illustrated with specific examples of inheritance in plants and animals, including man. Prerequisite: one year of college work in biology, botany, or zoology. 1955-56 and alternate years, evening; 1956-57 and alternate years, morning.

139 *Cell Physiology* (3)

Yocum

The fundamental physiology of protoplasm. Prerequisite: Chemistry 12 and one year of college biology, botany, or zoology. (Not offered in 1955-56.)

199-200 *Proseminar in Biology* (3-3)

Munson, Bowman

Individually planned and directed study by means of which majors in biology may correlate and supplement the subject matter presented in various regular courses. Morning.

THIRD GROUP

201-2 *Seminar: Cytology* (3-3)

Munson, Bowman

Biology 202, evening. (Biology 201 not offered in 1955-56.)

211-12 *Research in Cytology* (arr.)

Munson, Bowman

Time and credits to be arranged. (Also offered 1955 summer term—Biology 212 (arr.))

299-300 *Thesis* (3-3)

Bowman

Time to be arranged. (Also offered 1955 summer term—Biology 300 (3))

BOTANY*

‡Lawson Edwin Yocum, Ph.D., *Professor of Botany, Executive Officer*
 William Webster Diehl, Ph.D., *Adjunct Professor of Mycology*
 Lyman Bradford Smith, Ph.D., *Professorial Lecturer on Taxonomy*
 John Gilbert Palmer, Ph.D., *Assistant Professor of Botany*
 _____, *Assistant Professor of Botany*

Bachelor of Arts or Bachelor of Science with a major in Botany (Columbia College—Departmental).—Prerequisite: the Arts and Letters or the Science curriculum, respectively, in the Junior College, and pages 64-65.

Required: In addition to the general requirements as stated on page 77-80, a minimum of twenty-four credit hours in Botany toward the introductory course with laboratory as recommended in curriculum.

Master of Arts or Master of Science in the field of Botany (Columbia College).—Prerequisite: the equivalent of a Bachelor of Arts or Bachelor of Science degree, respectively, from the University with a major in Botany.

Beyond: the general requirements as stated on page 84-87.

Doctor of Philosophy (Institute Course).—See page 92.

FIRST GROUP

1. *Structure and Functions of the Flowering Plants* (5) Yocum, Palmer

The typical plant as a working mechanism, with the emphasis on the general biological functions of plant physiology. Material on the course (12 hours); laboratory (12 hours)—morning, afternoon, and evening sessions. (Also offered 1955 summer term.)

Botany 18, same as 1, offered spring term. Lecture—morning; laboratory—afternoon.

2. *Survey of the Plant Kingdom* (3) Palmer

Survey of the different kinds of plants, with emphasis on the morphology of the plant kingdom; practice in identifying flowering plants. Material on the course (12 hours); laboratory (12 hours)—morning, afternoon, and evening sessions. (Also offered 1955 summer term.)

SECOND GROUP

3. *Field Botany* (3) Palmer

Field trip to neighboring localities of botanical interest, with class room study. Prerequisite: Botany 1 and 2 or Botany 1 and 3. Lecture (12 hours); laboratory (12 hours); field trip (12 hours). Total 36 credits. Same. Evening.

*See also the Department of Botany, University and Institute.

†The course is offered only in the College.
 ‡The Department of Botany, University and Institute, is now under the jurisdiction of the Department of Science in a University system.

- 107 *Algae, Fungi, and Mosses* (3) _____
Field and laboratory study of the habitus, structure, and identification of representative leafy forms of algae, fungi, and mosses. Prerequisite: Botany 1 and 2 or Biology 1-2. (Not offered in 1955-56.)
- 109 *Plant Morphology* (3) Palmer
Survey of structure of root, stem, leaf, and flower of seed plants followed by the application to several of the economically important families. Prerequisite: Botany 1 and 2 or Biology 1-2. Lecture (2 hours); laboratory (2 hours). (Not offered in 1955-56.)
- 110 *Plant Growth* (3) Palmer
The functions of plants with special emphasis on the practical problems of growing and of caring for plants. Prerequisite: Botany 1 or Biology 1. Lecture (2 hours); laboratory (2 hours). (Not offered in 1955-56.)
- 118 *Physiology of Bacteria and Fungi* (3) Yocum
Lectures, literature reviews, and laboratory studies of the physiology of bacteria and fungi. Prerequisite: Botany 1 and 2 or Biology 1-2, 1955-56 and alternate years. Evening.
- 12-26 *Plant Taxonomy* (3-3) Palmer
A study of the characteristics, phylogeny, and geography of selected families of the flowering plants. Field collection and identification. Prerequisite: Botany 1 and 2 or Biology 1-2. Material fee, \$0. Lecture (1 hour); laboratory and field (4 hours). 1956-57 and alternate years.
- 131-32 *Mycology* (3-3) Diehl
Lecture (1 hour); laboratory (4 hours). 1956-57 and alternate years.
- 133-34 *Plant Pathology* (3-3) Diehl
Manual fee, \$2 a term. (Not offered in 1955-56.)
- 135-36 *Plant Physiology* (3-3) Yocum
Two terms: mineral and water relations (3 plants); spring term: growth, nutrition, and growth. Prerequisite: Chemistry 11-12. Material fee, \$7 a term. 1956-57 and alternate years.
- 141-42 *Plant Ecology* (3-3) Yocum, _____
Lecture (2 hours); laboratory (2 hours). 1955-56 and alternate years. Evening.
- 143 *Introduction to Plant Geography* (3) _____
Survey of the basic principles and methods of plant geography. Prerequisite: Botany 1 and 2 or Biology 1-2. 1956-57 and alternate years.
- 144 *The Vegetation of North America* (3) _____
Lectures, surveys, and laboratory in the characteristic vegetation of North America with emphasis on the United States. Prerequisite: Botany 1 and 2 or Biology 1-2. 1956-57 and alternate years.

161 *Soils* (3)

Composition, characteristics, geographic distribution, and uses of soils. (For students interested in plant distribution, ecology, and soils. Geography 128, *Economic Geography*, Agriculture 131, *Conservation of Natural Resources*, and 132, *Land Use* are recommended as electives.) 1955-56 and alternate years. Evening.

THIRD GROUP

221-22 *Seminar: Taxonomy* (3-3)
(Not offered in 1955-56.)

Smith

235-36 *Seminar: Physiology* (3-3) Yocum,
1955-56 and alternate years. Time to be arranged.

241-42 *Seminar: Ecology* (3-3)
(Not offered in 1955-56.)

295-96 *Research* (arr.)

The Staff

Time, credits, and fees to be arranged. (Also offered 1955 summer term—Botany 295 131.)

299-300 *Thesis* (3-3)

The Staff

Time to be arranged. (Also offered 1955 summer term—Botany 299 (3).)

BUSINESS ADMINISTRATION

Richard Norman Owens, Ph.D., C.P.A., *Professor of Business Administration*

Harold Griffith Sutton, M.S., *Professor of Finance*

Joe Lee Jessup, M.B.A., *Professor of Business Administration*

James Carlton Dockeray, Ph.D., *Professorial Lecturer in Business Administration*

Montell Ernest Ogdon, Ph.D., *Professorial Lecturer in Business Administration*

Joseph Leo Krieger, M.B.A., *Professorial Lecturer in Business Administration*

Carl William Clewlow, A.M., *Professorial Lecturer in Business Administration*

Eugene Fields, B.S., C.P.C.U., *Professorial Lecturer on Insurance*

John Jay Corson, Ph.D., *Professorial Lecturer in Business Administration*

Reuben Horchow, M.B.A., LL.B., *Professorial Lecturer in Business Administration*

Gordon Gouverneur Barnewall, Ph.D., *Associate Professor of Business Administration*

Frederick Timberlake, M.B.A., *Instructor in Business Administration*

Augustus Clark Johnson, A.M., *Lecturer in Business Administration*

John Alexander Scott, M.B.A., *Lecturer in Business Administration*

Robert Kaye, A.M., *Lecturer in Business Administration*

William Williams Edwards, A.M., *Lecturer in Business Administration*

Bachelor of Arts in Government with a major in Business Administration (School of Government)—For curriculum see pages 181-82

Master of Business Administration (School of Government)—Prerequisite: an undergraduate major in Business Administration or the equivalent.

Required: the general requirements for the degree as stated on pages 182-92.

Doctor of Business Administration (School of Government)—Prerequisite: a Master's degree in Business Administration or a related field, or the equivalent, and proficiency in Statistics and Accounting to the satisfaction of the Committee on Doctoral Studies.

Required: thirty credit hours of graduate work beyond the Master's level, the passing of a general examination in six fields, and the writing and defending of a dissertation.

Bachelor of Science in Engineering with an option in Business Administration (School of Engineering)—See pages 131-32 and 137.

Bachelor of Arts in Education with teaching fields in Business Education (School of Education)—Prerequisite: the Education curriculum pages 125-64.

Required: the Business Education option, pages 159-60, and the professional studies listed on page 164.

SECOND GROUP

- 101 *Business Organization and Combination* (3) Timberlake
Simple and interrelated forms of business enterprise and their control by government. Evening.
Business Administration 1-IX, same as 121, offered spring term Morning
- 102 *Business Management* (3) Timberlake
The management movement, organization of an enterprise, principles of management and their application to various departments of an enterprise. Evening. (Also offered 1955 summer term.)
Business Administration 1-IX, same as 102, offered fall term Morning
- 105 *Personnel Management in Industry* (3) Owens
Organization and work of the personnel department, human relations in business. Morning.
Business Administration 1-IX, same as 105, offered spring term Evening
- 106 *Problems in Personnel Management* (3) Owens
Principles of human relations illustrated by cases drawn from business and industry. Prerequisite: Business Administration 1-5. Morning.
Business Administration 1-IX, same as 106, offered fall term Evening
- 109 *Office Management* (3) Johnson
Organization and layout of an office, use of office machines and appliances, planning and execution of work, supervision problems. Evening.
(Also offered 1955 summer term.)
Business Administration 1-IX, same as 109, offered spring term Evening
- 113 *Real Estate* (3) Horchow
Fundamentals of real estate practice: leasing and property management, valuation, financing, and taxation. Evening
- 116 *Urban Transportation* (3)
Local transportation in economic development; regulation, finance, operation, and management of transit systems, community planning for streets, highways, parking, and traffic control. (Not offered in 1955-56.)
- 1218 *General Insurance* (3) Horchow
A general course in underlying principles of property, life, marine, and casualty insurance, and the function of insurance in the economy and life of a business or individual. Prerequisite: Economics 1-2. Evening
- 123-24 *Property and Casualty Insurance A and B* (2-2) Fields
The principles and practice of property and casualty insurance with emphasis on the economics of insurance, types of coverage, contract provisions, agency and brokerage, and state regulation and supervision. (Not offered in 1955-56.)

- 125-26 *Property and Casualty Insurance C and D* (2-2) Fields
The principles and practices of property and casualty insurance with emphasis on theory of probability, rates and rating, reserves, financial statements, and investments; loss adjustment and loss prevention. Prerequisite: Business Administration 123-24. Evening.
- 127-28 *Property and Casualty Insurance E and F* (2-2) Fields
Principles of accounting, principles of business and personal finance; business organization and agency management. Evening.
- 129-30 *Property and Casualty Insurance G and H* (2-2)
Insurance law with particular attention given to construction of the various contracts, and general commercial law as it relates to insurance. Agency, underwriting, compensation, personal property, real estate and mortgages, equitable interests, bankruptcy, business succession and estate matters, and insurance. (Not offered in 1955-56.)
- 131 *Business Finance* (3) Timberlake
Basic principles involved in the financing of business enterprises. Prerequisite: Accounting 1-2. Morning. (Also offered 1955 summer term.)
Business Administration 1418, same as 131, offered spring term. Evening.
- 136 *Commercial Credit* (3) Timberlake
Types and sources of credit information; credit relationships from the viewpoint of the commercial bank and the commercial business enterprise. Prerequisite: Accounting 1-2. Evening.
- 138 *Investments* (3) Timberlake
Analysis of factors of investment credit with attention to different types of investments; proper selection of investments for various kinds of savings institutions. Prerequisite: Accounting 1-2. Morning. (Also offered 1955 summer term.)
- 141 *Principles of Marketing* (3) Barnswall
A survey of marketing, with particular attention to consumer, retailing, wholesaling, and sales management, the retail marketing structure and its relation to the total economy. Prerequisite: Economics 1-2. Morning.
Business Administration 1418, same as 141, offered spring term. Evening.
- 142 *Marketing Problems* (3) Barnswall
Marketing principles applied to specific distribution policies and consumer problems of retailers, wholesalers, and manufacturers handling consumer and industrial goods. Prerequisite: Business Administration 141. (Not offered in 1955-56.)
- 143 *Marketing Research* (3) Barnswall
Study of market research methods and techniques; sources of data; the use of market research in business operations. (Not offered in 1955-56.)
- 145 *Sales Management* (3) Barnswall
Organization of the sales department, sales planning and forecasting, quotas, territories, performance standards and analysis and control.

- of distribution costs. Prerequisite: Business Administration 141 Evening.
- 146 *Sales Management Problems* (3) Jessup
Problems of marketing executives with respect to planning sales programs, territories, and salesmen's quotas; selection, training, and supervision of sales force. Prerequisite: Business Administration 145 (Not offered in 1955-56.)
- 147 *Advertising* (3) Barnewall
Advertising as a function of marketing and merchandising, evaluation, purchase, criticism, and control of advertising, uses and limitations of advertising as a tool of management. Morning.
- 148 *Wholesaling* (3)
The wholesale function; organization and types, economics of wholesale authorities. (Not offered in 1955-56.)
- 150 *Principles of Purchasing* (3) Barnewall
Organization for purchasing, purchasing policies, market relationships, selection of merchandise, purchasing information and records. Morning.
- 151X *Retailing* (3) Barnewall
Principles and problems in retail merchandising, including market, inventory valuation, and expense control, service and personnel problems. Morning.
- 152 *Traffic Management and Warehousing* (3)
Organization and records of traffic department, routing of shipments, services by carriers, rates and charges, relation of shipper to transportation agencies, problems of storage and inventory management. (Not offered in 1955-56.)
- 175 *Introduction to Foreign Trade* (3) Kaye
Terminology, trade usages and practices, conditions essential to successful trading, economic bases of international trade, obstacles to trade, tariffs, impact of governmental controls on private trade. Prerequisite: Economics 1-2. Evening.
- 176 *Exporting and Importing* (3) Kaye
Policy and operating questions of foreign trade, financing and documentation of shipments. Prerequisite: Business Administration 175 Evening.
- 178 *Foreign Markets* (3) Ogden
Patterns of world trade by countries and commodities, methods of preparing market surveys, selected regional market analyses. Prerequisite: Economics 1-2. (Not offered in 1955-56.)
- 191 *Business Reports and Analyses* (3) Dockett
Research in specific business problems and reports for management use. Open to seniors. (Not offered in 1955-56.)
- 195 *Controllershship* (3) Jessup
The duties, responsibilities, and place of the controller in a business organization; relations of controller to other departments and regulatory bodies; and the controller's relation to price setting and inven-

ories, depreciation policies, internal auditing, expense control and budgeting, and financial reports to management, stockholders, and employees. Prerequisite: Accounting 1-2. Open to seniors. Evening.

- 197 *Introduction to Business Policy* (3) Owsen
Significance of business policies in management; formulation of policies; relation of various organizational levels to policy making; some important policies, including case problems.
Summer term 1945.

- 198 *Problems in Business Management* (3) Joshi
Principles and methods of management illustrated by cases drawn from business and industry. Prerequisite: Business Administration 102. Open to seniors. Evening.
Business Administration 195x, same as 198, offered fall term. Morning.

THIRD GROUP

- 231 *Corporate Financial Problems* (3) Dockeray
Financial practice in promotion, consolidation, and mergers; capital structure adjustments, and reorganization. Evening.
- 232 *Seminar in Business Finance* (3) Dockeray
Research in advanced financial problems. Evening.
- 241-42 *Seminar in Marketing* (3-3) Barnewall
An advanced course in marketing, emphasizing special and current problems in the field. (Business Administration 241 is not a prerequisite for Business Administration 242.) Evening.
- 258x *Management Engineering* (3) Clewlow
Analysis of the techniques for selection and implementation of management engineering programs, with emphasis on organization and methods, covering including the study of work measurement, work simplification, management audits, and other management improvement projects. Evening.
- 273-74 *Readings in Business* (3-3) The Staff
Advanced readings in the fields of finance, marketing, and personnel management. Topics to be announced.
- 278 *The Dynamics of Business* (3)
An analysis of the structure of American business, including a study of trend and cyclical changes in economic activity and their bearing upon government policy. (Not offered in 1955-56.)
- 280 *Management in the Armed Forces* (3) Clewlow
Special problems of military organization and management; application of business management techniques to the armed forces. (Not offered in 1955-56.)
- 287 *Relation of Government to Business* (3) Corson
Activities of government in their relation business management in such areas as labor relations, wages, production, and prices. (Not offered in 1955-56.)

- 288 *Executive Leadership* (3) Corson
An examination of the role of the executive in public and private administration. An intensive consideration of the ways the executive accomplishes his objectives by planning, organizing, communicating with and developing staff, and measuring their performance; a balanced review of literature and practical illustrations. (Not offered in 1955-56.)
- 291-92 *Seminar in Business Management* (3-3) Owens
Research in various phases of management, including business, public, and personnel management. Prerequisite: (A) Also offered 1955 summer term 1956.
- 293-94 *Business Research* (3-3) The Staff
(Not offered in 1955-56.)
- 295 *Comptrollership in the Federal Service* (3) Krieger
Function of the comptroller in federal agencies, special problems and basic comptroller function in government and business. Prerequisite: (A)
- 296 *Seminar in Comptrollership* (3) Jessup
Research on advanced problems of the comptroller in all types of federal government and the Federal Government. Prerequisite: (A)
- 297-98 *Business Policy* (3-3) Jessup
Problems of management are analyzed with the view of developing practical solution; cases are used to show the problems of personnel in marketing, industrial management, finance, etc. Prerequisite: (A)
- 299-300 *Thesis* (3-3) The Staff
Time to be arranged. (Also offered 1955 summer term—Business Administration 299 (3).)

COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above, the University offers the following courses especially for students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, Military Economics and Politics Program and Engineering Administration

- 168 *Management Engineering* (3)
169 *Reports and Analysis* (3)
261-62 *Advanced Management* (3-3)
265-66 *Seminar in Comptrollership* (3-3)
268 *Management Engineering* (3)
271-72 *Management for Engineers* (3-3)
275 *Administration in Government* (3)
284 *Readings and Conferences in Management* (3)
288 *Executive Leadership* (3)

CHEMISTRY

Benjamin Douglass Van Evert, Ph.D., S.D., *Professor of Chemistry*
 Samuel Nathaniel Wynn, Ph.D., *Professor of Chemistry*
 Charles Rudolph Nasser, Ph.D., *Professor of Chemistry, Executive Officer*

Robert Corbin Vincent, Ph.D., *Associate Professor of Chemistry*
 Paulen Esselstyn Wood, Ph.D., *Associate Professor of Chemistry*
 William Frederick Sager, Ph.D., *Associate Professor of Chemistry*
 James Willard Harkness, B.S., Ed.M., *Associate Professor of Chemistry*
 Theodore Peter Perios, Ph.D., *Assistant Professor of Chemistry*
 William Edward Schmidt, Ph.D., *Assistant Professor of Chemistry*
 David Cover White, B.Chem. Eng., Ph.D., *Assistant Professor of Chemistry*

Ruth Haverstock Ness, M.S., *Instructor in Chemistry*

Registration. Before completing registration each student must obtain from the representative of the Department an assignment to lecture, recitation, and laboratory sections.

Bachelor of Arts or Bachelor of Science with a major in Chemistry (College of Arts and Sciences Department).—Prerequisites: the Arts and Letters in the Sciences (College Department) in the Junior Catalogue, pages 44 and 45. The minimum number of credit hours must be included: Chemistry 11-12, 21, and 22; Mathematics 19 and 20; Physics 5, 6, 7, and 8.

Students should consult the general requirements for each of these majors, including the laboratory hours, given courses: Chemistry 11-12, 13-14, 15, 11-12, and 137 or 142 (not credit hours). The work of the junior and senior years must be approved by the Department. The German language is strongly recommended for all majors, and both French and German are recommended for students planning to graduate work.

Master of Arts or Master of Science in the field of Chemistry (Education College).—Prerequisites: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Chemistry from the University, or the equivalent.

Students should consult the general requirements as stated on pages 44-45. The three hours of research hours must include Chemistry 11-12, 13, 11-12, 11-12, 11-12, 11-12, 11-12, and the project must include at least one credit hour of laboratory work. On the basis of lecture to pass qualifying examinations given during the first week of classes, students may be admitted from their freshman courses and second or junior semesters. A reading knowledge examination in French or German (German preferred) must be passed before the second half of the work is started.

Doctor of Philosophy (University Council).—See page 45.

Bachelor of Science in Engineering with an option in Chemistry (School of Engineering).—Prerequisites: 11-12 and 137. The University requires for the degree in the same 44 hours required for the Bachelor of Science degree with a major in Chemistry at various times.

Bachelor of Arts in Education with a teaching field in Chemistry (School of Education).—Prerequisites: the Education curriculum, pages 42-43.

Required the Chemistry option, page 120, and the professional courses listed on page 124.

FIRST GROUP

- †3-4 *Survey of Physical Sciences* (4-4) Schmidt
Survey of physical sciences. An introduction to the physical sciences including chemistry, physics, astronomy, and geology with emphasis on methods of scientific method and its achievements rather than on the mechanics of science. A terminal course for non-science majors. Laboratory fee, \$10 a term. Lecture (3 hours), morning; laboratory (1 hour), afternoon.
- †11-12 *General Chemistry* (4-4) Naeser and Staff
Chemistry 11-12 is an elementary course in general chemistry. Pre-quisite: one year of high school algebra. Laboratory fee, \$10 a term. Lecture (2 hours), laboratory (4 hours), recitation (1 hour)—morning, afternoon, and evening sections. (Also offered 1955 summer term.)
Chemistry 11x, same as 11, offered spring term. Morning, afternoon, and evening sections.
Chemistry 12x, same as 12, offered fall term. Afternoon and evening sections.
- 21 *Qualitative Inorganic Analysis* (4) Vincent
Theoretical and practical study of methods of separating and identifying the more common cations and anions using systematic tests. Prerequisite: Chemistry 11. Laboratory fee, \$10 a term. Lecture (2 hours), laboratory (6 hours)—afternoon and evening sections. (Also offered 1955 summer term.)
Chemistry 21x, same as 21, offered spring term. Afternoon and evening sections.
- 22 *Quantitative Inorganic Analysis I* (4) Schmidt
Theory and practice of quantitative analysis by typical volumetric and gravimetric procedures. Prerequisite: Chemistry 21. Laboratory fee, \$10 a term. Lecture (2 hours)—morning and evening sections; laboratory (12 hours)—morning, afternoon, and evening sections.

SECOND GROUP

- †111-12 *Physical Chemistry Lectures* (3-3) Wood
Introduction to physical chemistry. Students registering for Chemistry 111-12 must register concurrently for Chemistry 113-14 unless they already have adequate credit for physical chemistry laboratory. Prerequisite: Chemistry 22 and 152, Mathematics 20, Physics 8. Lecture (3 hours)—morning and evening sections.
- †113-14 *Physical Chemistry Laboratory* (2-2) Wood
Laboratory to accompany Chemistry 111-12. Students registering for Chemistry 113-14 must register concurrently for Chemistry 111-12 unless they already have credit for laboratory in physical chemistry. Laboratory fee, \$10 a term. Laboratory (4 hours)—morning and Saturday sections.

- 122x Quantitative Inorganic Analysis II (4)** Schmidt
A continuation of Chemistry 22 including the theory and practice of organic reagents, electrochemistry, and colorimetry in the analysis of more complex materials. Prerequisite: Chemistry 22. Laboratory fee, \$10.50. Lecture (12 hours)—afternoon and evening sections, laboratory (16 hours)—evening section.
- †131-32 Inorganic Chemistry (2-2)** Naeser
Application of modern chemical theories to inorganic substances and reactions, detailed study, developed from the periodic table, of the descriptive chemistry of the more common elements. Prerequisite: Chemistry 152. Prerequisite or concurrent registration: Chemistry 111-12 and 113-14. Evening.
- 135-36 Inorganic Chemistry: Preparations (2-2)** Petros
Application of the technique of inorganic chemistry to the preparation and purification of a list of selected substances. Prerequisite: Chemistry 152. Prerequisite or concurrent registration: Chemistry 111-12 and 113-14. Laboratory fee, \$10.50 a term. Laboratory (16 hours)—evening.
Chemistry 135x, same as 135, offered spring term. Evening.
- †151-52 Organic Chemistry (4-4)** Wrenn
Chemistry of the compounds of carbon. Credit is not given for Chemistry 151 until Chemistry 152 is completed. Prerequisite: Chemistry 21, Chemistry 111.—Laboratory fee, \$10. Lecture (4 hours)—morning and evening sections, laboratory (3 hours)—afternoon and evening sections. Chemistry 151x.—Laboratory fee, \$10.50. Lecture (2 hours)—morning and evening sections, laboratory (4 hours)—afternoon and evening sections. (Also offered 1955 summer term.)
- 155x Organic Chemistry: Preparations (2 or 3)** Wrenn
The synthesis of organic compounds and the application of the technique of organic chemistry to the preparation of pure compounds, using larger amounts and greater refinements than in Chemistry 151-52. Prerequisite: Chemistry 21 and 152. Laboratory fee, \$10 a credit hour. Evening.
- 156x Qualitative Organic Analysis (3)** Wrenn
The identification of pure organic compounds, the separation of mixtures, and the identification of their components. Required of all students planning their work in the field of Organic Chemistry. Prerequisite: Chemistry 21 and 152. Laboratory fee, \$10.50. Lecture (1 hour). Laboratory (16 hours)—evening.
- 191x History of Chemistry (2)** Perron
The development of chemistry, and the biographies of eminent chemists, to the present. Prerequisite: Chemistry 22 and 152. 1955-56 and alternate years. Evening.

*To a prerequisite may be waived in the case of the student with a grade of C or above in Chemistry.

- 193 *Chemical Literature* (1) Wienn
A general course in chemical literature with reference work and reports. Prerequisite: Chemistry 22 and 132; prerequisite or concurrent enrollment: Chemistry 111-12 and 113-14. Evening.

THIRD GRADE

- 2033 *Chemical Kinetics* (2) Wood
The rates of chemical reactions and the factors influencing them. Prerequisite: Chemistry 112, 1355-56 and advanced years. Evening.
- 211-12 *Advanced Physical Chemistry* (2-2) Wood
Development of the principles of thermodynamics and kinetic theory and their application to chemical systems. Prerequisite: Chemistry 111-12 and 113-14. Evening.
- 215 *Statistical Mechanics* (3) Sager
An introduction to classical and quantum statistics designed to acquaint the student with the basic principles and applications of the subject. Prerequisite or concurrent enrollment: Chemistry 112 or permission of instructor. First- or second-semester years.
- 221-22 *Advanced Analytical Chemistry* (2 or 3) Schmidt
A study of the theory and application of chemical and physical-analytical methods of analysis. Prerequisite: Chemistry 22 and 112. The student may be taken for 2 credits a term without the laboratory work. Laboratory fee \$10 a term. Lectures 12 hours; laboratory 13 hours—optional. (Not offered in 1953-54.)
- 231-32 *Special Topics in Inorganic Chemistry, (the Chemistry of the Less Familiar Elements)* (2-2) Peters, White
Fall term: the lanthanide and actinide elements, with emphasis on their metallurgy and chemistry; the platinum metals with emphasis on their complex ion formation. Spring term: boron, beryllium, magnesium, and organometallic compounds, and metal carbonyls, the discovery and use of some of the less common elements such as cerium, gallium and indium. Prerequisite: Chemistry 111 and 112, 1355-56 and advanced years. Evening.
- 233-34 *Radiochemistry* (2-2) Peters, White
The properties, properties, and uses of radioactive isotopes, both natural and artificial. Prerequisite: Chemistry 111-12. (Not offered in 1953-54.)
- 231-32 *Advanced Organic Chemistry* (3-3) Sager
The synthesis, reactions, and properties of carbon compounds, the fundamental theories of organic chemistry. Prerequisite: Chemistry 132, prerequisite or concurrent enrollment: Chemistry 111-12, 113-14, and 115. Evening.
- 243 *Advanced Synthetic Organic Chemistry* (3) Wienn
A study of the reactions involved in the synthesis of organic compounds. Prerequisite: Chemistry 231. Evening.

- 257 *Theoretical Organic Chemistry* (3) Sager
A survey of modern theories of organic chemistry with emphasis on reaction mechanisms. Prerequisite: Chemistry 152, 155, 56, and at least one year of Physics.
- 291-92 *Seminar: Recent Developments in Chemistry* (1-1) The Staff
Individual investigations of special problems. All students registered for a Master's degree in Chemistry are required to attend this seminar for the minimum for the degree, and to take part in its programs. Credit for participation in the seminar work may be obtained by registration for the course during the last two terms of residence; this may, however, be based upon the seminar work during the entire period of residence. Evening.
- 295-96 *Research* (4-16) The Staff
Research on problems approved by the Staff. Open to qualified students with advanced training. Laboratory fee \$7 a week. Time and credits to be arranged. (Also offered 1955 summer term.)
- 296-300 *Thesis* (1-13) The Staff
Laboratory fee \$16 per term. Time to be arranged. (Also offered 1955 summer term.)

CIVIL ENGINEERING

Carl Hugo Walther, B.E., M.C.E., *Professor of Civil Engineering*
 Bruce Douglas Greenshields, C.E., Ph.D., *Professor of Civil Engineering*
 Martin Alexander Mason, B.S. in Eng., Ing.-Dr., *Professor of Civil Engineering*

Waldo Edward Smith, B.E. in C.E., M.S. in C.E., *Professorial Lecturer in Civil Engineering*

Ralph Edward Fuhrman, M.S. in Eng., D.Eng., *Professorial Lecturer in Civil Engineering*

Raymond Pugh Eyman, C.E., *Associate Professor of Civil Engineering*
 Hauren Albert Miklofsky, B.C.E., M.Eng., D.Eng., *Associate Professor of Civil Engineering, Executive Officer*

Richard Henry Welles, B.C.E., *Lecturer in Civil Engineering*

John Gordon Hammer, M.C.E., Ph.D., *Lecturer in Civil Engineering*
 Walter Ernest Bron, B.M.E., M.S. in Met., *Lecturer in Civil Engineering*

Bachelor of Civil Engineering (School of Engineering)—See pages 131-34 for statement of requirements.

Master of Science in Engineering (School of Engineering)—See pages 134-37 for statement of requirements.

Civil Engineer (School of Engineering)—See page 142 for statement of requirements.

FIRST GROUP

2 *Plane Surveying* (2) Eymann
 Principles, methods, and instruments used in surveying; with field work. Prerequisite: Trigonometry. Surveying for \$12. Lecture (1 hour)—field work (13 hours)—afternoon and Saturday sessions.

21 *Analytical Mechanics: Statics* (2) Walther and Staff
 Composition and resolution of forces, axial stresses, centrifugal force, moments. Prerequisite: Physics to prerequisite or concurrent registration. Mathematics 20. Marine and evening sessions.
 Civil Engineering 21x, same as 21, offered spring term. Eymann

22 *Analytical Mechanics: Dynamics* (3) Greenshields and Staff
 Kinematics of a particle, kinetics of a body in translation, rotation, and plane motion; work and energy, impulse and momentum, fluid vibrations. Prerequisite: Civil Engineering 21. Marine and evening sessions.

Civil Engineering 22x, same as 22, offered fall term. Eymann

23 *Higher Surveying* (4) Eymann
 Elements of geodesy, triangulation, levelling, hydrography, astronomical and trigonometric levelling, with field work. Prerequisite: Civil Engineering 22.

Engineering 2. Surveying fee, \$12. Lecture, laboratory, and field work. 1955-56 and alternate years, afternoon. 1956-57 and alternate years, Saturday morning.

24 *Elementary Photogrammetry* (3)

History and development of photogrammetry; fundamental principles, methods, and instruments used in photographic surveying and production of maps; photographic interpretation; principles of stereoscopy. Laboratory work with photographs and instruments in determination of scale, tilt, relief, and map plotting. Prerequisite: Civil Engineering 24. Drawing fee, \$10. Evening.

25-26 *Engineering Materials* (2-2)

Eyman, Greenfields

Lectures on properties and uses of nonmetallic materials such as cements, fuels, and plastics; and metallic materials including steel, copper, aluminum, and alloys. Prerequisite or concurrent registration: Chemistry 12. Morning and evening sections.

SECOND GROUP

123 *Strength of Materials* (3)

Walther, Mikolfsky

Tension, compression, shear, flexure, and torsion; deflections; combined and working stresses. Prerequisite: Civil Engineering 21. Morning and evening sections.

136 *Elementary Fluid Mechanics* (3)

Mason, Smith

Hydrostatics, dynamic equations, motion of particles, applications to aerodynamics and compressible fluid flow. Prerequisite: Civil Engineering 22. Morning and evening sections.

140 *Materials and Hydraulics Laboratory* (2)

Greenfields

Determination of the properties of materials by mechanical tests, and a study of the flow of fluids. Prerequisite: Civil Engineering 123; prerequisite or concurrent registration: Civil Engineering 26 and 26B. Laboratory fee, \$10. Laboratory (3 hours)—afternoon and evening sections.

141 *Graphic Statics* (3)

Eyman

Fundamental principles, analysis of beams, determination of stresses in roof trusses and framed beams. Prerequisite or concurrent registration: Civil Engineering 140. Drafting-room fee, \$5. Lecture (2 hours); drafting room (3 hours). 1955-56 and alternate years, evening; 1956-57 and alternate years, afternoon.

142 *Bridge Stresses* (3)

Eyman

Determination of stresses in modern types of bridge trusses. Prerequisite: Civil Engineering 141. Drafting-room fee, \$5. Lecture (2 hours); drafting room (3 hours). 1955-56 and alternate years, evening; 1956-57 and alternate years, afternoon.

147-48 *Structural Design* (2-2)

Mikolfsky

Computations and drawings for the design of steel structures. Prerequisite: Civil Engineering 142. Drafting-room fee, \$5 a term. Drafting room (6 hours). 1955-56 and alternate years, afternoon; 1956-57 and alternate years, evening.

- 149-50 *Concrete and Masonry Construction* (3-3) Walther
Plain concrete, general requirements, and theory of reinforced concrete foundations, and retaining walls. Prerequisite: Civil Engineering 25 and 125. Civil Engineering 149, laboratory fee, \$10; Civil Engineering 150, drafting room fee, \$5. Lecture (2 hours); laboratory or drafting room (3 hours). 1955-56 and alternate years—lecture, morning; laboratory or drafting room, afternoon. 1956-57 and alternate years—evening.
- 151-52 *Statistically Indeterminate Structures* (2-2) Walther
A study of such structures as continuous beams, rigid frames, and arches by methods of work, slope deflection, and moment distribution. Prerequisite: Civil Engineering 142. 1955-56 and alternate years—evening. 1956-57 and alternate years, morning.
- 164 *Highway Engineering* (3) Greenshields
Highway construction, location, construction, and maintenance. Prerequisite: Civil Engineering 25. 1955-56 and alternate years, morning. 1956-57 and alternate years, evening.
- 181-82 *Water Supply and Sewerage* (3-3) Fuhrman
Collection, storage, distribution, and distribution of water; sewerage systems and treatment of sewage. Prerequisite: Civil Engineering 130. Chemistry 12. 1955-56 and alternate years, evening; 1956-57 and alternate years, morning.
- 187-88 *Engineering Contracts and Specifications* (2-2) EYMAN
Contract essentials, types, and legal principles; analysis and preparation of specifications. Prerequisite or concurrent registration: Civil Engineering 24-26. 1955-56 and alternate years, evening. 1956-57 and alternate years, morning.
- 189-90 *Civil Engineering Penetration* (1-1) Greenshields
Late afternoon.
- 192 *Soil Mechanics* (3) Mikolofsky
The basic concepts of the behavior of soil as an engineering material. Prerequisite: Civil Engineering 25, 115, and 116. 1955-56 and alternate years, evening. 1956-57 and alternate years, morning.

THIRD GROUP

- 201 *Advanced Mechanics of Materials* (3) Walther
Advanced topics in the mechanics of materials. Stresses at a point, thick cylinders, internal bending, torsion, localized stress, and stress concentrations. 1955-57 and alternate years—Evening.
- 202 *Applied Elasticity* (3) Walther
The theory of elasticity as applied in three-dimensional analysis of stress, strain, torsion, and bending. 1956-57 and alternate years.
- 203 *Foundation Problems* (3) Mikolofsky
The integration of structural theory and soil mechanics, as applied to foundation, retaining wall, slope stability, and drainage problems. The

Interrelationship of structural action and soil stability is emphasized
1955-56 and alternate years. Evening

204 *Theory of Structures* (3)

Miklofsky

Advanced analysis and design of indeterminate structures, such as
continuous and suspension bridges, frame building frames, arches, rigid
frames, and columns. 1955-56 and alternate years. Evening

205 *Prestressed Concrete Theory* (3)

A study of the theory and application of prestressed concrete, in-
cluding the design of prestressed concrete structural. 1956-57 and
alternate years. Evening

209-302 *Thesis* (3-5)

The Staff

Time to be arranged

CLASSICAL LANGUAGES AND LITERATURES

John Francis Latimer, Ph.D., *Professor of Classical Languages and Literatures, Executive Officer*

The Department of Classical Languages and Literatures offers two types of courses: (1) those which illustrate the literary, linguistic, and cultural backgrounds of Western Civilization, and for which no knowledge of the ancient languages is required. These courses are designed to supplement and strengthen the (broad general) backgrounds of students who plan to concentrate in the fields of English or other literature, History, Art, Drama, or Philosophy, or of those who wish to increase their general knowledge and appreciation of the basis of the great humanistic traditions as part of a well-rounded education. (2) Two years of Latin and two years of Greek are offered alternately for those who wish to follow the program requirements of the Junior College as set forth on page 67.

COURSE IN ENGLISH TRANSLATION

- 71-72 *Greek and Roman Backgrounds in Literature* Latimer
(3-3)
Selected Greek and Roman masterpieces and their literary influences.
(Not offered in 1955-56.)

LANGUAGE COURSES

- 71-2 *First-year Latin* (3-3) Latimer
Functional presentation of the essentials of the language, with special
stress on reading selections. Development of English derivatives and
introduction to Roman life and literature. 1955-56 and alternate
years. Evening.
- 73-4 *Second-year Latin* (3-3) Latimer
A continuation of the preceding course, but with increased emphasis
on reading Latin selections which illustrate Roman life and literature.
Continuation of vocabulary building in English. Prerequisite: Course
in Language 1-2 or two years of high school Latin. 1956-57 and
alternate years.
- 711-12 *First-year Greek* (3-3) Latimer
Essentials of grammar. Reading selections from the New Testa-
ment and various Greek. 1956-57 and alternate years.
- 713-14 *Second-year Greek* (3-3) Latimer
Review of grammar. Emphasis on reading selections from
classical and various Greek. 1957-58 and alternate years. Evening.

RELATED COURSE IN ANOTHER DEPARTMENT

- Art 121-22 *World History of Art* (3-3)

DERMATOLOGY AND SYPHILOLOGY

Harry Ford Anderson, M.D., *Professor of Dermatology and Syphilology.*
Executive Officer

George William Creswell, A.B., M.D., *Assistant Clinical Professor of*
Dermatology and Syphilology

Harold Kirby-Smith, B.S., M.D., *Assistant Clinical Professor of Der-*
matology and Syphilology

Theodore Clémenton Chen Fong, M.D., *Associate in Dermatology and*
Syphilology

James Quincy Gant, Jr., M.S., M.D., *Associate in Dermatology and*
Syphilology

Wendell Melvin Willett, M.D., *Associate in Dermatology and Syphi-*
lology

Reuben Goodman, M.D., *Associate in Dermatology and Syphilology*

313-14 *Dermatology and Syphilology* The Staff
Lectures on diseases of the skin and syphilis. One hour a week

316 *Neurosyphilis* Fong
Lectures, case demonstrations, and practical diagnostic and thera-
peutic procedures.

317-18 *Clinic* The Staff
Case demonstrations, diagnosis, and treatment of skin diseases and
syphilis. D. C. General Hospital.

477-8 *Clinic* The Staff
Dermatology and syphilology in infants and children. Two hours a
week. Children's Hospital.

499-10 *Clinic* The Staff
Clinical demonstrations, diseases of the skin. Two hours a week.
University Hospital.

ECONOMICS

Arthur Edward Burns, Ph.D., *Professor of Economics*
 Donald Stevenson Watson, Ph.D., *Professor of Economics*
 Gerhard Colm, Dr. rer. pol., *Professorial Lecturer in Economics*
 Ralph Aubrey Young, M.B.A., Ph.D., *Professorial Lecturer in Economics*
 Jacques Jacobus Polak, Ph.D., *Professorial Lecturer in Economics*
 George Wythe, Ph.D., *Professorial Lecturer in Economics*
 Charles David Stewart, M.S.S., LL.B., *Professorial Lecturer in Economics*
 George Jaszi, Ph.D., *Professorial Lecturer in Economics*
 Frederick Thorp Moore, Ph.D., *Professorial Lecturer in Economics*
 Edward Campion Acheson, Ph.D., *Associate Professor of Finance*
 James Coogan, Ph.D., *Associate Professor of Economics, Executive Officer*
 Walter David Fackler, A.B., *Assistant Professor of Economics*
 Wilson Emerson Schmitt, Ph.D., *Assistant Professor of Economics*
 _____, *Assistant Professor of Economics*

Bachelor of Arts with a major in Economics (Columbia College—Departmental).—Prerequisites: the A-1 and Letters curriculum in the Junior College, including Economics 1-2 and Statistics 87, are 110-114.

Required: the general requirements as stated on pages 77, 81 and (1) Economics 111-112 and 121 and fifteen additional hours in selected group courses to be selected with the approval of the advisory (2) Economics 122 which may be taken with the completion of twenty-one of the required hours in the major (3) Statistics 111-112 (4) one credit hour of other work in an approved field from the following departments: Accounting, Business Administration, History, Philosophy, Political Science, Sociology, and Statistics.

Bachelor of Arts with a major in Latin American Civilization (Columbia College—Departmental).—See the Department of History, page 57.

Master of Arts in the Field of Economics (Columbia College).—Prerequisites: the degree of Bachelor of Arts with a major in Economics at this University or the equivalent.

Required: the general requirements for the degree are stated on pages 81-82. The thirty hours of required work must include (1) twelve credit hours in courses numbered 201-208, 210, 214, 231, (2) six credit hours in one of the following fields: public finance, monetary and fiscal policy (Economics 211-212), labor economics (Economics 213, 241), economic policy (Economics 205, 206), international relations (Economics 231-232, 243) and (3) three credit hours in approved electives.

Doctor of Philosophy (Columbia University).—See page 92.

Bachelor of Arts in Government with courses in Economics (School of Government).—See page 37, 38.

Master of Arts in Government with a major in Economic Policy (School of Government).—Prerequisites: the degree of Bachelor of Arts with a major in Economics at this University, or the equivalent.

Required: the general requirements for the degree are stated on pages 81-82.

18-27. The thirty hours of required work must include Economics 205, 206, and the thesis, Economics 207-08.

For information concerning other Master of Arts curricula in the School of Economics, see courses in Economics, see pages 183-90.

Bachelor of Science in Engineering with an option in Economics (School of Engineering)—See pages 186-87, 187-88.

FIRST GROUP

- 1-2 *Principles of Economics** (3-3) The Staff
Survey of the major economic principles, institutions, and problems in contemporary economic life. Economics 1 is prerequisite to Economics 2. Morning and evening sections. (Also offered 1955 summer term.)
Economics 1X, same as 1, offered spring term. Morning and evening sections.
Economics 2X, same as 2, offered fall term. Evening.

SECOND GROUP

- 101-2 *Economic Analysis* (3-3) Cogan, Watson, Fackler
Analysis of demand, supply, and resource pricing; theory of national income determination; pricing of productive services; welfare economics. Economics 1-2 is prerequisite to 101-2. Morning and evening sections. (Also offered 1955 summer term.)
Economics 101X, same as 101, offered spring term. Evening.
- 104 *History of Economic Thought* (3) Fackler
History of the major schools of economic thought; influence of economic problems on the development of economic theory. Evening.
- 105 *Business Cycles* (3) Cogan
Analysis of business history in economic instability; survey of recent business cycle theories. Morning.
- 121 *Money and Banking* (3) Acheson
Theory of money, credit, and banking; historical background; the Federal Reserve System; open market operations; international aspects of money; current monetary problems. Morning and evening sections. (Also offered 1955 summer term.)
Economics 121X, same as 121, offered spring term. Evening.
- 122 *Monetary Theory and Policy* (3) Acheson
Principal contemporary theories; background of recent monetary policy, 1945-50 and alternate years, evening; 1950-57 and alternate years, morning.
- 124 *Financial Institutions and Economic Development* (3) Acheson
Evolution and growth of the money-mechanism in United States economy; changing relationships of money markets to role of government; study emphasis on monetary framework for national economic development. 1950-57 and alternate years.

* Economics 1-2 is prerequisite to all other courses in Economics.

- 126 *Foreign Exchange and International Finance* (3) Acheson
The theory and practice of the foreign exchanges, current methods of international transfer. Evening.
- 133 *The Economy of the Soviet Union* (3) Coogan
Development and main features of the economic life of the Soviet Union. (See History 146, 246, and Geography 297.) (Not offered in 1955-56.)
- 141-42 *Labor Economics* (3-3)
Wages, hours, and employment; labor organizations; labor legislation and the federal administrative boards. Morning.
- 141-62 *Public Finance and Taxation* (3-3) Fackler
General survey of government expenditures, sources and methods of taxation, economic effects of expenditures and taxes, and of government debt policies. (1955-56) and alternate years, morning, 1956-57 and alternate years, evening.
- 105 *Government Control of Economic Activity* (3) Watson
Changing role of government in promoting and regulating economic activity, types and spheres of control. Evening.
- 166 *Comparative Systems of Economic Reform* (3) Watson
Critical analysis of the major theories of economic and social reform, with special attention to their origins and backgrounds. (Not offered in 1955-56.)
- 171 *Economics of Transportation* (3)
History, organization, competition, rates, and regulation of motor, air, rail, and water carriers. (Not offered in 1955-56.)
- 172 *Economics of Public Utilities* (3)
Regulation, valuation, rate making, development, and public policy. (Not offered in 1955-56.)
- 181-82 *International Economics* (3-3) Schmidt
Survey of world economic theories of international trade, analysis of international economic problems, and the international organizations. American and foreign theories. (Also offered 1955 summer term.)
- 183-84 *International Economic Policy* (3-3) Schmidt
Historical and theoretical analysis of tariffs, exchange rates, customs, and trade control, discrimination, and capital movements, policies related thereto. (Not offered in 1955-56.)
- 185-86 *Economic History and Problems of South America* (3-3) Wythe
Evolution and existing structure of the economies of the South American Republics, with particular emphasis on basic factors affecting development and prospects. (See also Geography 192.) 1956-57 and alternate years.
- 187-88 *Economic History and Problems of Middle America* (3-3) Wythe
Economic structure and development of Mexico, Central America, and the Antilles with attention both to individual country situations and

to regional and over-all problems. (See also Geography 191, 1955-56) and alternate years, evening.

- 198 *Readings and Research* (3) The Staff
Comprehensive survey of economics. Open only to students whose major is economics and who have completed twenty-one hours of course work in economics. Time to be arranged.
Economics 1983, same as 198, offered spring term. Time to be arranged.

THIRD GROUP

- 201-2 *History and Literature of Economic Thought* (3-3) Burns
Critical analysis and interpretation of the development and the interaction of economic thought, regions, and problems of the major types of theory, and their relation to present problems and policies. Evening.
- 203-4 *Contemporary Economic Theory* (3-3) Watson
The contributions of Marshall, Chamberlin, Robinson, Hicks, and others. Evening.
- 205 *Theory of Employment and Income* (3) Polak
Determinants of the level of employment and income, Keynesian and classical systems contrasted, and related literature on the subject. Evening.
- 206 *Business Cycle Theory* (3) Coogan
The general characteristics of business cycle theory and discussion of particular theories. Evening.
- 208 *The National Income* (3) Javori
The theory of economic aggregates, measurement and policy aspects of national income. (Not offered in 1955-56.)
- 211 *Readings in Advanced Economics* (3) Burns and Staff
Integration and coordination of advanced economic theories. Evening.
Economics 2113, same as 211, offered spring term. Time to be arranged.
- 213 *Economic Thought in the Twentieth Century* (3) Burns
Contributions of Economics 201-2. The principal trends in economic thought during the present century. (Not offered in 1955-56.)
- 2143 *Quantitative Economics* (3)
Social accounting, firms and costs, budget and income accounts, money flows and input-output analysis, aggregative econometric models, measurement, the econometric estimating technique, analysis of changing composition of economic aggregates. Evening.
- 219-20 *Managerial Economics* (3-3) Watson
Analysis of price, production, and inventory policies of business firms. Evening.
- 223-24 *Monetary Policy and Central Banking* (3-3) Young
The money system in its relation to national income, monetary policies of the Federal Reserve and other central banking systems. Evening.

- 241 *Labor Economics* (3)
Implications of industrialism for labor, questions of social policy, contributions of economics to solutions of labor problems. Evening
- 244 *Labor Relations* (3)
The industries, bargaining process and the elements comprising a analysis of the policies of labor and of management. Evening
- 251 *Theories of Economic Development* (3)
Growth and change in economic activity, capital accumulation, innovations in technology and business organization.
Summer term 1955
- 261-62 *Public Finance and Fiscal Policy* (3-3) Cohn
Survey of the major contributions to the theory and doctrine of public finance. Special problems, deficit financing, current tax problems and federal, state, and local relationships. Evening
- 265 *Theory of Economic Policy* (3) Watson
The theory, aims, methods, and objectives of economic policy; the relation of economic theory to economic policy. Evening
- 266 *Problems of Governmental Economic Policy* (3) Watson
The application of economic policy as they are affected by the demands of government. Evening
- 267 *Economic Organization of the Communist Order* (3) Cogan
Development of the Soviet-type economy; organization under the Soviet system and problems; monetary, fiscal, production, foreign trade, economic growth. (See also History 145, 146 and Geography 141.) Evening
- 281-82 *International Economics* (3-3) Schmidt
The economic theory of international economics, the variations of, including the history of payments, technology of clearing, international institutions. Evening
- 284 *United States Foreign Economic Policy* (3) Schmidt
Analysis of foreign aid programs, international, commercial, and monetary policy of the United States. United States and international economic organization.
Summer term 1945
- 285-86 *Economic Development of Latin America* (3-3) Wythe
Current policies and programs, capital formation, public and private foreign trade and investment, social and technological preconditions of development. Lectures 275, Middle America, evening. (See course 280, South America, not offered in 1954-55.)
- 287-88 *Latin America: Trade and Commodity Policy* (3-3) Wythe
Tariffs and exchange control systems, historical and current commercial agreements, trends of trade, 1925-50 and alternate years. (Not offered in 1957-58.)

- 249 *Problems in International Financial Policy* (3) Abboton
International financial problems in recent decades and analysis of
current economic problems of several countries. Evening.
- 249-68 *Thesis* (School of Government majors) (3-3) The Staff
Thesis to be awarded.
- 249-69 *Thesis* (3-3) The Staff
(Approved 1955 summer session.)

COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above, the University offers the following courses especially for students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, Military Economics and Politics Program, and Engineering Administration.

- 195 *Commercial and Industrial Economics* (3)
- 249-70 *The Economic Structure and Potential of the Soviet Union* (3-3)
- 271-72 *Applied Economic Analysis* (3-3)
- 273 *Industrial Economics* (3)
- 274 *Economic Intelligence* (3)
- 275-76 *Principles and Procedures of Target Analysis* (3-3)

EDUCATION

James Harold Fox, A.M., Ed.D., *Professor of Education*
 Burnice Herman Jarman, A.M., Ed.D., *Professor of Education*
 Blake Smith Root, A.M., Ed.D., *Professor of Education*
 Ralph Windsor Ruffner, A.M., Ed.D., *Professor of Education, Executive Officer*
 Meredith Chester Wilson, B.S., *Adjunct Professor of Education*
 Ray La Forest Hamon, Ph.D., *Professorial Lecturer in Education*
 Charles Edward Bish, A.M., Ed.D., *Professorial Lecturer in Education*
 John Frederick Broughter, A.M., Ed.D., *Professorial Lecturer in Education*
 Madaline Kinter Remmlein, Ph.D., J.D., *Professorial Lecturer in Education*
 Joseph Bueal Johnson, A.M., Ed.D., *Professorial Lecturer in Education*
 Jean Dresden Grambs, A.M., Ed.D., *Professorial Lecturer in Education*
 Anthony Charles LaBue, B.S., Ed.D., *Associate Professor of Education*
 Mary Ellen Coleman, A.M., *Assistant Professor of Education*
 LuVerne Crabtree Walker, A.M., *Lecturer in Education*
 Florence Mary Lumsden, A.M., Ed.D., *Lecturer in Education*
 William Samuel Rambough, B.S. in E.E., Ed.D., *Lecturer in Education*
 Howard Odan Johnson, A.M., Ed.D., *Lecturer in Education*
 Raymond Ray Reed, A.M., *Lecturer in Education*
 Grover LaMarr Angel, A.M., Ed.D., *Lecturer in Education*
 Eugenia Campbell Nowlin, A.M., *Lecturer in Education*
 Friel Gardner Welshans, A.M., *Lecturer in Education*

CONSULTANTS IN RESEARCH

Wesley Earl Armstrong, A.B., Ed.D., *Chief for Teacher Education, U. S. Office of Education*
 John Robert Lullington, Ph.D., *Specialist of Industrial Arts, U. S. Office of Education*
 Francis James Brown, Ed.D., *Staff Associate, American Council on Education*

FIELD SERVICE COORDINATOR

Helen King Finlay, A.M., *Supervisor of Secondary Education, Arlington County, Virginia*
 Mary Forest Maté, A.M., *Assistant Principal and Dean of Girls, Wash-
 ington Junior-Senior High School, Arlington, Virginia*

Alexander Anderson, A.M., *Assistant Principal, Washington-Lee High School, Arlington, Virginia*

Bachelor of Arts in Education (School of Education).—Prerequisite: the Education curriculum in the Junior College or the equivalent, or a certificate of graduation from an accredited tertiary school or the equivalent, are plans 113-114.

Required: the satisfactory completion of a program of at least sixty-six credit hours in addition to the general education background courses in the Junior College curriculum. Each program is planned individually to meet the certification requirements of the State, see pages 137-144.

Master of Arts in Education (School of Education).—Prerequisite: a Bachelor's degree from an accredited institution. Programs are planned individually. The degree areas of specialization are available: (1) school administration—secondary school principalship, or elementary school principalship; (2) adult education; (3) secondary education—the senior or junior high school; (4) elementary education—intermediate grade or early childhood education; (5) agricultural education; (6) curriculum; (7) employee training; (8) education; (9) research.

Doctor of Education (School of Education).—See pages 172-73.

A Reading Clinic

Coleman and Staff

Diagnosis of reading difficulties: individual or group lessons without academic credit. Fee: for diagnosis, \$4.50; for individual lesson, \$3.00; for group lesson, \$2.50; material fee, \$3.

SECOND GROUP

129-130 *Learning and Teaching (3-3)*

Ruffner

For the general student as well as the prospective teacher. Fall term: nature of learning approached through the study of actual classroom situations. Spring term: nature of teaching approached through observation of typical classroom situations. Lecture (2 hours), conferences (one hour)—evening and evening sessions; field work (2 hours) to be arranged. (Also offered 1945 summer term.)

Electives 113, same as 113, offered fall term. Evening.

111 *Elementary School Curriculum (6)*

La Bar

For students in the elementary school curriculum. An integrated course dealing with the learning experience—designed to meet the developmental needs of children in the natural and social sciences, the language arts, and concepts of number. Also includes the study of general classroom procedures and the evaluation of pupil progress. To be taken concurrently with Education 143. Prerequisite: Education 129-130 and 111-112. All day Tuesday and Thursday, including 113.

112 *Elementary School Art (3)*

Nowlin

For students in the elementary school curriculum. Materials and methods. Prerequisite: Psychology 1 and 20. Material fee, \$1.00. Lecture and laboratory (3 hours)—evening; field work to be arranged.

113 *Elementary School Music (3)*

Reed

For students in the elementary school curriculum. Materials and methods. Prerequisite: Psychology 1 and 20. Lecture (2 hours)—evening; field work (2 hours) to be arranged.

- 115 *Elementary School Reading* (3)
For teachers. Methods of teaching beginners and the basic principles of reading skills. Prerequisite: Education 107-11 and 121-22 or teaching experience. Lecture (2 hours)—evening, field work (2 hours)—to be arranged.
- 116 *Elementary School Social Studies* (3) Welshans,
For teachers. Content and method of teaching. Prerequisite: Education 107-11 and 121-22 or teaching experience. Lecture (2 hours)—evening, field work (2 hours)—to be arranged. (Also offered 1915 spring term to experienced teachers. Welshans.)
- 117 *Elementary School Science* (3)
For teachers. Materials and methods. Prerequisite: Education 107-11 and 121-22 or teaching experience. Lecture (2 hours)—evening, field work (2 hours)—to be arranged.
- 120 *Elementary School Arithmetic* (3)
For teachers. Content, materials, and methods. Prerequisite: Education 107-11 and 121-22 or teaching experience. Lecture (2 hours)—evening, field work (2 hours)—to be arranged.
- 121-22 *Society and the School* (3-3)
For the general student as well as the prospective teacher. For the first, methods and fundamental principles of education; for the second, the school with other community agencies. Spring term, general education and education of schools, education and teaching. Lecture (2 hours), discussion (1 hour)—evening and evening work (2 hours)—to be arranged. (Also offered 1915 spring term. April.)
Education 1223, same as 122 offered fall term. Evening.
- 128 *Children's Literature* (3) W. O. C.
For teachers in the elementary school curriculum. Explore and examine the newer books for children and the children's stories, discussing the contribution of literature in child development, and create children's original expressions. Prerequisite: Education 107-11 and 121-22. Lecture (2 hours)—evening, field work (2 hours)—to be arranged.
- 131 *Common Teaching Skills* (3) Root
For teachers in the secondary school curriculum. Content, methods, and basic planning, structural techniques used in connection with motivation, the classroom, group procedures, directing study, individual differences, evaluation, clerical material, discipline, the homeroom, safety, community, public relations. Prerequisite: Education 107-11 and 121-22. Early afternoon.
Education 1313, same as 131, offered spring term. Evening.
- 133-34 *Observation and Student Teaching* Root, La B. B.
(3-3 All O)
For students in the elementary or the secondary school curriculum. Education 131, student-teaching fee, \$35. Admission by permission.

of the instructor. Prerequisite: Education 109-110 and 121-22. Time to be arranged individually.

SPECIAL METHODS COURSES*

To be listed in the senior year after substantial preparation in the teaching fields covered by the students in the secondary period curriculum. Course requirements and hours of credit vary with human requirements. Preparation of students' teaching are studied and actual teaching content as found in various texts and courses of study is reviewed.

- 136 *Teaching English* (2 to 4) Lammien
Prerequisite* eighteen credit hours of English. Lecture (2 hours)—evening; field work (2 hours)—to be arranged.
- 138 *Teaching Social Studies* (2 to 4) Root
Prerequisite* twenty-four credit hours of social studies. Lecture (2 hours)—evening; field work (2 hours)—to be arranged.
- 142 *Teaching Mathematics* (3) Weida
Prerequisite* Mathematics through calculus. Late afternoon.
- 144 *Teaching Science* (2 to 4) Rumbough
Prerequisite* twenty-four to forty credit hours of science. Lecture (2 hours)—late afternoon; field work (2 hours)—to be arranged.
- 146 *Teaching Foreign Languages* (2 to 4) Doyle, Keating
Prerequisite* eighteen credit hours of one foreign language. Late afternoon.
- 148 *Teaching Home Economics* (2) Kirkpatrick
Prerequisite* thirty credit hours of Home Economics. Time to be arranged.
- 150 *Teaching Business Subjects* (2) Slatt
Prerequisite* thirty credit hours of business education. Time to be arranged.

THIRD GROUP†

- 205.6 *The Curriculum*§ (3-5) Bish
For experienced teachers. Full term, curriculum foundations and theory, comparison of curriculum patterns. Spring term, principles and problems in curriculum development, group consultation of student problems. Supply number.
- 207 *Curriculum Material*§ (3) Bish
For experienced teachers. The study and construction of courses of study, resource units, classroom teaching aids, and inexpensive materials; direct application to students' own situations.

Summer term, 1955.

* Prerequisite to all special methods courses. Education 109-110, 121-22, and 131. Additional prerequisites are listed with each course.

† A three-term or summer curriculum in prerequisite to all third group courses.

§ Prerequisite: adequate professional preparation.

- 209-10 *Child Growth and Developments* (3-3) LaBue
Basic factors in human growth and development and their relation to learning and teaching. Related practical experience in studying children; case analyses of procedures and results. Evening.
- 212 *Evaluation in Education** (3) Rollner
Concept of evaluation, relationship between evaluation of class and means, steps involved in the evaluation of learning outcomes. As the course progresses each student develops solutions for evaluation problems related to his work situation. (Not offered in 1955-56.)
- 213-14 *History of Education* (3-3) Jarman
Fall term: the European background of American education. Spring term: the evolution of the American school system. Evening.
- 215 *Education of the Exceptional** (3) LaBue
For classroom teachers. A survey of current problems in the education and guidance of exceptional pupils. Nature and needs of those physically, mentally, or emotionally handicapped; needs of the gifted. Resources for help in correction, diagnosis, therapy, education, and guidance. (Not offered in 1955-56.)
- 216 *Education of the Slow Learner** (3) LaBue
Identification, nature, and needs of the slow learner at the elementary and junior high school levels. Emphasis upon curriculum development designed for regular classroom teachers who must provide special methods and materials in the education and guidance of the slow learner. Also of interest to special-class teachers and administrators. Summer term 1955.
- 217-18 *Contemporary Problems in Education** (3-3) Jarman
Fall term: designed to help students formulate a personal philosophy of education. Spring term: social foundations of education—a study of the forces that shape the policies and objectives of the school. Evening. (Also offered 1955 summer term—Education 217-18.)
- 219 *Recent Developments in Elementary Education** (3) Jarman
For experienced teachers. New areas of emphasis, changing techniques of working with children, curriculum trends, review of recent literature. Summer term 1955.
- 220 *Intermediate Grade Education** (3) Jarman
A study of the curriculum and methods of teaching in the intermediate grades, based upon a growing understanding of the child and his environment. (Not offered in 1955-56.)
- 221-22 *Early Childhood Education** (3-3) Jarman
For experienced teachers. Fall term: nursery school and kindergarten education. Spring term: education in the primary grades. (Not offered in 1955-56.)

* Prerequisite: adequate professional preparation.

- 222-24 *Reading Problems** (3-5) Coleman
For experienced teachers. A clinical approach to reading difficulties on elementary and secondary school levels. Demonstrations and observations, with clinic cases. Evening.
- 223 *Elementary School Reading* (3) Coleman
Developmental and remedial approaches to reading problems. Demonstrations of diagnostic and corrective techniques used in the Reading Clinic.
Summer term 1955.
- 227 *Elementary Education* (3) LaBue
Clinical approach to present-day programs, objectives, organization of learning experiences, teaching methods, staff organization. Saturday morning.
- 228 *Methods in Elementary Education* (3) LaBue
For experienced teachers. Improvement of classroom procedures in the six broad areas of the elementary school program, meeting individual differences, evaluating pupil progress. Saturday morning.
- 229 *Administration of Elementary Education* (3) LaBue
For experienced teachers and administrators. Administration as a means of achieving instructional objectives, providing learning and teaching activities, handling supplies and equipment, maintaining the building, and insuring school and community life. Emphasis upon methods of action. Evening. (Also offered 1955 summer term.)
- 231 *Secondary School Classroom Procedures** (3) Bish
Survey of current classroom practices with particular attention to selected topics such as teacher-pupil planning, group procedures, pupil activity, formative and summative activities, individual and group evaluation techniques, working with, and review of recent literature. Evening. (Also offered 1955 summer term.)
- 233 *Instructional Materials** (5) L. Johnson
Role of instructional materials in learning, selection, evaluation, and use of materials; administrative problems in the area; acquisition, maintenance, and use of instructional materials and equipment. Material fee, \$6. Lecture (2 hours), laboratory (2 hours)—Saturday morning.
- 239 *Teaching the Core Curriculum** (4) Bish
An examination and study of current teaching procedures appropriate to the core program. (Not offered in 1954-55.)
- 243 *Human Relations in the Classroom** (4)
Problems and practices involved in interpersonal relationships between learner and teacher and among learners.
Summer term 1955.
- 247 *Guidance in Secondary Schools** (3) Brumfielt
Survey, needs, organization of the program; services to students, the instructional staff, and the administrative personnel needed for the program. Evening. (Also offered 1955 summer term.)

* Intended for eligible professional personnel.

254 *The Junior High School** (3)

Bish, Root

Purposes, organization, core program, guidance, developing course of study, extra-curricular activities. (Not offered in 1955-56.)

255-56 *Secondary Education** (3-4)

Root

For four current proposals for the organization of secondary education. Studies from various quarters in each of the subject content fields. Saturday morning. (Also offered 1955 summer term.)

257-58 *Secondary School Management** (3-3)

H. Johnson

For experienced teachers and administrators with two years of experience teaching in secondary schools. Management planning, execution and control, critical appraisal and management construction of the school schedule, leadership, personnel policies in the development of new plans and programs. Two sessions. Evening.

263-64 *Employee Training* (3-3)

Root

For new, mature and potential teachers and administrators in comprehensive, selective, department, vocational, adult, health training fields and techniques commensurate with their professional functions. Survey from current positions operating system and programs of national associations. Personnel, administrative and financial preparation in the years of experience in various fields. Evening.

270 *Art Education* (3)

Newble

For experienced teachers. Basic principles of modern art education, use of visual and tactile media; emphasis upon visual aids, memory, and use of miniature projects. Designed to increase awareness of the creative process. Prerequisite: Education 115. Evening.

271 *The Teacher and School Administration** (3)

Fox

A survey course for teachers and prospective administrators. Education and world affairs, national agencies, role of the state, local administration, school board, legal controls, school plant, public support, financial administrative procedures, improving teaching conditions. Saturday morning.

272 *The Teacher and School Supervision** (3)

Fox

Nation organization, human relationships, and techniques. Saturday morning. (Also offered 1955 previous term.)

276 *Seminar: Public Relations in School Administration** (3)

Root

Purposes, gathering materials, disseminating agencies, publicity, public participation in policymaking. (Not offered in 1955-56.)

278 *School Law** (3)

Reynolds

Source and scope of school law, legal rights and responsibilities of teachers, pupils and taxpayers. Other legal problems of major importance to the school. Evening.

* Prerequisite: degree program in education.

- 79-80 *Adult Education** (1-3) Rollins
Fall term: current concepts and objectives, agencies involved, programs on all levels—operational through community. Spring term: the adult as a learner, the teacher of adults, learning-teaching methods, administration of adult education programs. Evening. (Also offered 1955 summer term—Education 272 (3-1))
- 81 *Group Procedures in Education** (3) Rollins
Theory, practice, evaluation, and application to all educational levels. (Not offered in 1955-56.)
- 82 *Intraclassroom Activities** (3) Root
Nature and purposes of student activities—homework, clubs, assemblies, school publications, student council, interclassroom contests, group project activities in assemblies, tournaments, fairs, and exhibitions. Summer term 1955.
- 83-84 *Clinical Study of Reading Problems** (3-3) Cideman
For advanced students. Diagnostic and correction work under supervision in the Reading Clinic. Each student is expected to diagnose and treat pupils who are retarded in reading. Case studies are prepared and reported. Education 267 required for Ed. Preparation. Education 225-24 is the equivalent. Saturday morning.
- 85-86 *Supplementary Problems in Reading** (3-3) Cideman
For experienced teachers, principals, supervisors, and administrators. Consider the problems involved in planning, implementing, and improving the local reading program, in promoting cooperative effort on the part of the staff toward increasing reading efficiency. (Not offered in 1955-56.)
- 87 *Planning the School Plant* (3) Harrison
Selection of sites, evaluation of existing buildings, construction of plans for future adaptation to curricular needs, building operation and maintenance problems. Evening.
- 88-89 *Rotograph* (3-3) The Staff
Individual research under the guidance of a member of the staff. Projects and conclusions presented with an instructor.
- 89 *Educational Research Methods and Procedures* (3) Fry
Required of all Master of Arts candidates following Plan 2. Knowledge of elementary statistics required. Evening. (Also offered 1955 summer term.)
Education 225X, 226X or 227, offered spring term. Late afternoon.
- 90 *Reading in Education* The Staff
To enable those preparing for the comprehensive examination. No multiple choice or essay examinations. Tables for, \$15. Late afternoon. (Also offered 1955 summer term.)
Education 227X, 228X or 227, offered spring term. Late afternoon.
- 91 *Thesis* (3-3) The Staff
Required of all Master of Arts candidates following Plan 1. Thesis to be approved. (Also offered 1955 summer term.)

* Courses involving continuing education.

ELECTRICAL ENGINEERING

Norman Bruce Ames, M.S., E.E., LL.B., *Professor of Electrical Engineering, Executive Officer*

Forest Klaire Harris, Ph.D., *Professorial Lecturer in Electrical Engineering*

Donald Joseph Hanrahan, B.E.E., *Assistant Professor of Electrical Engineering*

Dwight Edward Shytle, *Lecturer in Electrical Engineering*

Benjamin Franklin Shingluff, B.S. in E.E., *Lecturer in Electrical Engineering*

Harold Valdemar Oerting, B.S. in E.E., *Lecturer in Electrical Engineering*

George Pida, B.E.E., *Lecturer in Electrical Engineering*

Kermit Milton Lovewell, B.S. in E.E., *Lecturer in Electrical Engineering*

William Herbert Gossard, A.B., M.S. in E.E., *Lecturer in Electrical Engineering*

George Abraham, M.S., *Lecturer in Electrical Engineering*

William Walter Balwanz, B.E.E., M.S. in E.E., *Lecturer in Electrical Engineering*

Donald Walter Lynch, M.S. in E.E., *Lecturer in Electrical Engineering*

Clifford Weeks Schmitz, Jr., B.S. in E.E., *Lecturer in Electrical Engineering*

James Milton Headrick, M.S. in E.E., *Lecturer in Electrical Engineering*

Bachelor of Electrical Engineering (School of Engineering).—See pages 141-142 and 144-145 for statement of requirements.

Master of Science in Engineering (School of Engineering).—See page 142 for statement of requirements.

Electrical Engineer (School of Engineering).—See page 142 for statement of requirements.

FIRST GROUP

9-10 *Elements of Electrical Engineering* (3-3) Ames, Schmitz
Electrical Engineering 9: magnetic and electric circuits, direct-current instruments and machines. Electrical Engineering 10: alternating-current circuits, instruments, and machines. Prerequisite: Physics 7. Prerequisite or concurrent registration: Mathematics 20. Morning and evening sections.

SECOND GROUP

- 105-6 *Direct-Current Laboratory* (2-2) The Stad
For the student majoring in electrical engineering. A course in measurements and direct-current dynamic laboratory. Prerequisite: Electrical Engineering 9-10. Laboratory fee, \$10 a term. Laboratory (3 hours)—afternoon and evening sections.
- 107 *Alternating-Current Circuits* (3) Hamahan
Alternating-current circuit theory. Extensive consideration is given to harmonic analysis and to the study of harmonics in both single-phase and polyphase circuits. Prerequisite: Electrical Engineering 10. Morning and evening sections.
- 108 *Alternating-Current Machinery* (3) Ames, Lovewell
Transformers and synchronous generators. Prerequisite: Electrical Engineering 107. Morning and evening sections.
- 109 *Alternating-Current Machinery* (3) Ames, Lovewell
Synchronous motors, polyphase induction motors, single-phase motors, converters, mercury arc rectifiers. Prerequisite: Electrical Engineering 108. Morning and evening sections.
- 111-12 *Electrical Measurements* (2-2) Harris, Hamahan
Theory of direct-current and alternating-current instruments, bridges, and meters. Prerequisite or concurrent registration: Electrical Engineering 107. Morning and evening sections.
- 115 *Advanced Network Theory I* (3) Balwanz
Theory of resonance, linear networks, transmission lines, and filters. Prerequisite: Electrical Engineering 107. Evening.
- 116 *Advanced Network Theory II* (3) Balwanz
Theory of transmission at UHF and VHF frequencies including Maxwell's equations, wave guides, and methods of power generation at those frequencies. Prerequisite: Electrical Engineering 115 and Physics 132. Prerequisite or concurrent registration: Physics 133. Evening.
- 123 *Advanced Network Laboratory I* (2) Gossard, Headrick
A laboratory course associated with Electrical Engineering 115. Laboratory fee, \$10. Laboratory (3 hours)—afternoon and evening sections.
- 124 *Advanced Network Laboratory II* (2) Gossard, Headrick
A laboratory course associated with Electrical Engineering 116. Prerequisite: Electrical Engineering 115. Laboratory fee, \$10. Laboratory (3 hours)—afternoon and evening sections.
- 129 *Symmetrical Components* (3) Singhall
Theory and application of symmetrical components in unbalanced circuits, alternating-current machinery, and transmission lines. Prerequisite: Electrical Engineering 108. Evening.

- 130 *Principles of Electric Power Transmission* (3) Slingrud
Mechanical and electrical characteristics of transmission lines, approxi-
mate and rigorous solutions by means of hyperbolic functions, steady-
state and elementary transient calculations, the three important
plans of distribution of electrical energy. Prerequisite: Electrical
Engineering 122. Evening.
- 131-34 *Alternating-Current Laboratory* (2-2) The Staff
A continuation of Electrical Engineering 125-6, with experiments in
impedance, power, circuits, instruments, and machinery. Prerequi-
site: Electrical Engineering 125 and 126. Laboratory fee: \$10.00.
Laboratory 18 hours; afternoon and evening sessions.
- 135 *Industrial Electrical Power Applications* (2) Hanrahan
The characteristics of the various types of electrical motors and other
power applications and the principles governing their applications in
industry. Prerequisite: Electrical Engineering 122. Evening.
- 136 *Illumination Engineering* (2) Corbin
Principles and practice in illuminating illumination engineering. Pre-
requisite: Electrical Engineering 122. Evening.
- 140 *Electrical Design* (3) Hyndman
Principles of design, with reference to materials of construction and
electrical systems. Practical exercises are assigned in connection
with classroom work. Prerequisite: Electrical Engineering 122. Lec-
ture (2 hours); laboratory 13 hours—evening.
- 145 *Applications of Electronic Devices* (3) Lyon
Practical applications of electronic devices such as power tubes,
voltage regulators, multivibrators, electronic counters, and auto-
mation. Prerequisite: Physics 111. Evening.
- 146 *Electronic Devices Laboratory* (2) The Staff
A laboratory course associated with Electrical Engineering 145. Lec-
ture fee: \$10.00. Evening.
- 189-92 *Prerequisite in Electrical Engineering* (1-1) Aches, Alford
(1-1)
Prerequisite: Electrical Engineering 1-8. Afternoon and evening ses-
sions.

THIRD GROUP

- 201 *Radio Wave Propagation* (3) Everett
Theory of the radiation and propagation of electromagnetic waves in
space, with consideration of practical applications to radio problems.
1935-36 and alternate years. Evening.
- 202 *Microwave Electronics* (3) Baldwin
Behavior of vacuum tubes at ultra-high frequencies. Theory and ap-
plications of microwave oscillators and transmission circuits. Measure-
ment techniques. 1936-37 and alternate years. Evening.

203 *Operational Analysis of Linear Systems* (3) Abraham
Analysis of circuits under steady state and transient conditions by op-
erational methods. Generality of the circuit concept. 1956-57 and
alternate years.

206 *Electronic Circuit Problems* (3) Lytle
Analysis and design of low power vacuum tube and transistor circuits:
amplifiers, oscillators, detectors, modulators, rectifiers, mixers, filters,
theory of measurements, non-linear analysis. 1956-57 and alternate
years.

297-300 *Thesis* (3-4) The Staff
Time to be arranged!

ENGLISH

Robert Whitney Bolwell, Ph.D., *Professor of American Literature*
 Ernest Sewall Shepard, A.M., *Professor of English Literature*
 Fred Salisbury Tupper, Ph.D., *Professor of English Literature*
 Calvin Darlington Linton, Ph.D., *Professor of English Literature*
 *Charles William Cole, Ph.D., *Professor of American Literature, Executive Officer*

William Lewis Turner, Ph.D., *Associate Professor of English*
 Robert Hamilton Moore, Ph.D., *Associate Professor of English Composition*

Averett Howard, A.M., *Associate Professor of English Composition*
 Mariel Hope McClanahan, Ph.D., *Associate Professor of English Composition*

James Harold Cokerly, Ph.D., *Associate Professor of American Literature*

Philip Higginbotham, Jr., Ph.D., *Associate Professor of English Literature*

John Gage Allee, Jr., A.M., *Assistant Professor of English*

Ruth Elsie Jones, A.M., *Assistant Professor of English Composition*

John Palmer Reesing, Jr., *Assistant Professor of English*

Raymond Howard Reno, A.M., *Instructor in English Composition*

Mary Jane Cook, A.M., *Instructor in English Composition*

Roy Clay Putman, A.M., *Instructor in English Composition*

Backlog of Arts with a major in American Thought and Civilization (College from College Field of Study).—Prerequisites: the Arts and Letters curriculum of the Junior College, six years 64, which should include English 71-72, History 71-72, Art 71-72, and Philosophy 51-52.

Required: the general requirements stated in years 77-83 and the study of the American Thought and Civilization major examination at the end of the senior year. The department field of knowledge upon which the student will be examined is manifested under four general headings: (1) European cultural history—the Renaissance and modern social and intellectual currents as a background to contemporary civilization with particular attention to English literature and history from the 16th through the 19th centuries; (2) American history—the political, economic, social, and religious thought and experience of the American people; (3) American philosophy and literature—a survey of philosophical movements with a knowledge of representative individuals; (4) American literature—a knowledge of major writers, together with a study of poetry, prose, and drama. The Department of English provides a program of study designed to assist the student in preparing himself for the major examination. The major adviser will give to each student as representative a check list of available major study resources.

*The additional name space will appear in the summer issue 64 (1964-65).

Bachelor of Arts with a major in English Literature (Columbian College—Field-of-Study).—Prerequisite: the Arts and Letters curriculum in the Junior College described on page 94. It is recommended that prospective majors elect English 91-92 from among the listed offerings.

Required: the general requirements stated on pages 77-83, and the passing of the English Literature major examination at the end of the senior year. The field of coordinated knowledge upon which the student will be examined at the end of his senior year is summarized under the following general headings: (1) the history of English literature from the Anglo-Saxon period; (2) the chief English writers (a certain familiarity with each man and his main works and a detailed knowledge of Shakespeare); (3) English social and political history as it bears upon or is reflected in the literature; (4) European intellectual backgrounds and movements which have affected English literature. The progression of work taken in each of these areas should be worked out by the student in consultation with one of the English Literature advisers. The Department of English provides a passbook (English 197-203) to assist the student in preparing himself for the major examination. A detailed description of the major is available in the office of the Dean of Columbian College.

Master of Arts in the Field of American Literature and Cultural History (Columbian College).—Prerequisite: the equivalent of an undergraduate major in this University in (1) History (with American history as a major part), (2) American Thought and Civilization, or (3) English Literature (with introductory courses in American literature and American history). The student who has not taken any of the above majors at this University must take a conduct examination.

Required: in addition to the general requirements stated on pages 84-87, the following specific requirements must be met: twelve of the required credit hours must be of senior study, six in American history and six in American literature; twelve of the required credit hours must be of second and third grade courses in the fields of American history, literature, philosophy, education, and art recommended by the adviser; a thesis (six credit hours) in any of the foregoing fields or in some combination of them. Because of the various undergraduate majors which will be accepted for admission to this program, a book reading list is assigned to all students, to assist in preparing them for the final Master's examination.

Master of Arts in the field of English and American Literature (Columbian College).—Prerequisite: an undergraduate major in English Literature, or American Thought and Civilization at this University, or twenty-four credit hours in English and/or American literature above the sophomore level. The student who has not taken either of the above majors at this University must take a conduct examination. The student offering such preparation (English and American literature) will be examined in English and American literature.

Required: in addition to the general requirements stated on pages 84-87, the following specific requirements must be met: (1) a schedule of courses amounting to twenty-four credit hours, planned in consultation with the adviser, on the basis of the student's undergraduate preparation, to include a comprehensive survey of American literature and of English literature from 1800; (2) a Master's thesis (six credit hours), written upon an approved topic under the direction of the instructor in whose field the major portion of the material falls; (3) a final written examination, on American literature and on English literature from 1800.

Master of Arts in the field of English Literature (Columbian College).—Prerequisite: an undergraduate major in English Literature at this University, or twenty-four credit hours in English literature above the sophomore level. The

student who has not passed the major examination in English at this University must take a candidacy examination which, in its scope and difficulty, is comparable to the major English examination.

Required: in addition to the general requirements stated on pages 84-87, the following specific requirements must be met: (1) a schedule of courses amounting to twenty-four credit hours, planned in consultation with the advisor; (2) a Master's thesis (not credit hours) written upon an approved topic under the direction of the instructor in whose field the material falls; and (3) a final written examination.

Degree in Philosophy (Graduate Council).—See pages 42-43.

Bachelor of Arts in Education with a teaching field in English (School of Education).—Prescribed: the Education curriculum, pages 18-20.

Required: the English option, page 110, and the professional curriculum listed on page 112.

ENGLISH COMPOSITION

FIRST GROUP

A English Practice (3)

The Staff

Instruction, drill, and exercises in grammar, vocabulary, spelling, and sentence in general; idiomatic and exercises in composition and writing. This course is designed to prepare students for English 1. (One is to be awarded. (Also offered twice; summer term.)

B English for Foreign Students (3)

Also

A course in reading and writing designed to prepare the student for English 1. Special attention is given to spelling, syntax, grammar, idiom, and vocabulary. Morning and evening sessions. (Also offered twice; summer term.)

1 English Composition* (3)

Moore and Staff

Review of grammar, exercises in composition, readings. Morning and evening sessions. (Also offered twice; summer term.)
English 1X, same as 1, offered spring term. Morning and evening sessions.

2 English Composition* (3)

Moore and Staff

Exercises in composition, readings. The second term of the student English Composition course required at all schools not in the Cambridge College curricula. Morning and evening sessions. (Also offered twice; summer term.)
English 2X, same as 2, offered fall term. Morning and evening sessions.

* Before students are registered in English 1, they are tested in a minimum proficiency in vocabulary, spelling, grammar, reading, logic, and writing skills. Those students who do not meet minimum requirements must be exempted from one or both terms of the English 1X. (Students whose names are inadequately prepared for English 1 will be exempted from English 1X.)

All non-College students (who are required to take one year of English) must take one year of Intermediate in English. Classical Languages, Foreign Languages, and other students who follow the schedule of English 1, last term of one in the intermediate course.

English 1 is necessary to all other courses in English. English 2 is the second term of the student composition course, requirement of students not required to follow the Cambridge College schedule.

4 *English Composition** (3) Moore and Staff

A course in critical analysis and practice of expository and argumentative techniques and in research procedure. The second term of the six-hour English Composition course required of students in the two-semester College curriculum. Prerequisite: English 1 and both terms of one of the introductory literature courses. Morning and evening sections. (Also offered 1955 summer term.)

English 4X, same as 4, offered fall term. Morning and evening sections.

11 *The Writing of Reports* (3) Turner and Staff

Theory and practice in the writing of technical reports. Prerequisite: English 1, and 2 or 4. Morning and evening sections. (Also offered 1955 summer term.)

English 11X, same as 11, offered spring term. Morning and evening sections.

SECOND GROUP

109X *Expository Writing* (3) Howard and Staff

A study of types of expository writing with weekly exercises. Prerequisite: English 1, and 2 or 4. Evening.

11A *Narrative Writing* (3) Howard and Staff

Study of the techniques of narrative writing and class exercises in creative writing. Prerequisite: English 1, and 2 or 4. Evening.

115X *The Writing of Fiction—the Short Story* (3)

Prerequisite: English 11X, consent of instructor. Evening.

116 *Advanced Exposition* (3) Moore

Theory and practice in the writing of expository articles and essays. Prerequisite: English 109, consent of instructor. (Not offered in 1955-56.)

117-18 *The Writing of Fiction—the Novel* (3-3) Howard

Writing a novel. Prerequisite: English 11X, consent of instructor. Evening.

ENGLISH LITERATURE

FIRST GROUP

51-52 *Introduction to English Literature*† Tupper and Staff
(3-3)

A historical survey. Prerequisite: English 1. Morning, afternoon, and evening sections. (Also offered 1955 summer term.)

91-92 *Introduction to European Literature*‡ Shepard and Staff
(3-3)

Classification of various types. Prerequisite: English 1. Morning and evening sections. (Also offered 1955 summer term—English 91 (3).)

* See catalogue for page 274.

† See catalogue for page 274.

‡ See catalogue for page 274.

SECOND GROUP*

- 121-22 *English Literature from the Beginnings to 1500* (3-3) Allee
Fall term, English literature prior to Chaucer; spring term, Chaucer. Evening.
- 125 *The Evolution of Modern Speech* (3) Allee
The development of the English language in a historical treatment of English grammar. (Not offered in 1955-56.)
- 126 *The Appreciation of Literature* (3)
The study of the principles of criticism and their applications to various literary types. (Not offered in 1955-56.)
- 129-30 *Elizabethan Non-dramatic Literature* (3-3) Tupper
Non-dramatic literature from 1485 to 1601. (Not offered in 1955-56.)
- 135-36 *Shakespeare* (3-3) Tupper
Evening. (Also offered 1955 summer term—English 136 (3).)
- 139-40 *The Seventeenth Century* (3-3) Lenton
First half, poetry and prose from 1603 to 1660; second half, Milton. Morning.
- 141-42 *The Neoclassical Movement* (3-3) Highfill
Poetry and prose from 1660 through the mid-eighteenth century. (Not offered in 1955-56.)
- 151-52 *The Romantic Movement* (3-3) Reisinger
From the mid-eighteenth century through Shelley and Keats. Evening.
- 161-62 *Victorian Literature* (3-3) Shepard
Poetry and prose from 1830 to 1900. Morning. (Also offered 1955 summer term—English 162 (3).)
- 175-76 *The Twentieth Century* (3-3) Lenton
British poetry, prose, and drama since 1900. Morning. (Also offered 1955 summer term—English 176 (3).)
- 181-82 *The English Novel* (3-3) Reisinger
Major English novelists from the eighteenth century to the present day. Morning.
- 183-84 *The English Drama* (3-3) Highfill
The first half is concerned principally with the drama of Shakespeare's contemporaries. The second half is a historical survey from 1600 to the present day. Morning.

* All pre-Columbian College students who are required to take one year of English, or more, and one year of language in English, Classical, Latin, French, German, or Spanish will follow the sequence of English 1, both terms of one of the introductory literature courses, and English 4.
English 10-11, 20-21, 30-31, Classical Languages and Literatures 210-21, French 51-52, German 51-52, or Spanish 41-42 is permissible to all students except those except English 121 and 122.

109-209 *Praseminar: Readings for the English Literature Major (3-3)* Tupper, Highfill

Conferences and group discussions. Afternoon and evening sections.

THIRD GROUP

222 *The Anglo-Catholic (3)*

(Not offered in 1955-56.)

223-24 *Old English (3-3)*

Allee

English language and literature before 1100. Fall term, Old English; second half, Old English. (Not offered in 1955-56.)

235-36 *Studies in Shakespeare and His Contemporaries (3-3)*

Tupper

Prerequisite: English 135-36. Evening. (Also offered 1955 summer term. English 235-36.)

237-40 *Studies in Seventeenth Century Literature (3-3)*

Linton

First half, ideal history of Milton, second half, Milton. (Not offered in 1955-56.)

241-42 *Studies in Neoclassical Literature (3-3)*

Highfill

Prerequisite: English 141-42. Evening.

244 *Studies in Eighteenth Century Drama (3)*

Highfill

(Not offered in 1955-56.)

251-52 *Studies in the Romantic Movement (3-3)*

Reesing

Prerequisite: English 151-52. English 252 offered spring term, evening. (English 251 not offered in 1955-56.)

261-62 *Studies in Victorian Literature (3-3)*

Shepard

Prerequisite: English 161-62. (Not offered in 1955-56.)

265-66 *Studies in Twentieth Century Literature (3-3)*

Linton

First and his contemporaries. English 265 offered fall term, evening. (English 266 not offered in 1955-56.)

295-96 *Studies in the History of English Literary Criticism (3-3)*

Shepard

Open to the non-major with the approval of the instructor. (Not offered in 1955-56.)

297-300 *Topics (3-3)*

The Staff

AMERICAN LITERATURE

FIRST GROUP

71-72 *Introduction to American Literature* (3-3)*

Bolwell and Staff

A historical survey. First half, from the beginning to the Civil War. Second half, from Civil War to the present day. Prerequisite: English 1. Meeting and evening sections. (Also offered, 1954 summer term.)

* See Institute on page 288

SECOND GROUP*

- 171-72 *Studies in American Literature* (3-3) Code, Bolwell
Major factors in the national cultural tradition as shown by our
standing writers. Prerequisite: English 51-52 or 71-72. Morena
- 173-74 *Major American Poets* (3-3) Cokerly
Advanced critical study of significant writers and movements. First
half: from beginning through nineteenth century. Second half: the
twentieth century. (Not offered in 1955-56.)
- 175-76 *American Drama* (3-3) Bolwell
Historical and critical study of significant plays and forms. First
half: from beginning through nineteenth century. Second half: the
twentieth century.
(Summer term 1955—English 176 (3))
- 177-78 *American Fiction* (3-3) Cokerly
Historical and critical study of significant novels and short stories.
First half: from beginning through nineteenth century. Second half:
the twentieth century. (English 177-78 offered spring term, 1955-56.)
(English 178 not offered in 1955-56.)
- 179-80 *Pragmatic Readings for American Thought and Civilization* Major (3-3) The Staff
Continued and group discussions. To be arranged

THIRD GROUP

- 271-72 *Seminar, American Literature* (3-3) Bolwell, Cokerly
Prerequisite: English 171-72 or the equivalent. Evenlow
- 277-78 *Studies in American Fiction* (3-3) Cokerly
Topic: Nineteenth Century Transcendentalism. Prerequisite: English
177-78 or the equivalent. (One of the undergraduate work sheets
pertaining to this department. (Not offered in 1955-56.)
- 279-80 *Thesis* (3-3) (1955-56)

RELATED COURSES IN OTHER DEPARTMENTS

Classical Languages and Literatures 71-72, *Greek and Latin*
Roman Backgrounds in Literature
Education 136, *Teaching English*
History 151-52, *English History*
Philosophy 111-12, *History of Philosophy*

*All pre-collegiate courses (two are required to take and pass in English) and the first of these in English, German, French, Spanish, Italian, and Latin will follow the outline of English in both parts of one of the introductory literature courses and English 4.

English 51-52, 71-72, 81-82, *Modern Classical Languages and Literatures* 71-72, 81-82, 91-92, or Spanish 51-52 is prerequisite to all second-year courses except those listed below.

GEOGRAPHY

Robert Dale Campbell, Ph.D., *Professor of Geography, Executive Officer*

Louis Otto Quam, Ph.D., *Professorial Lecturer in Geography*

Erik Fischer, Ph.D., *Professorial Lecturer in Geography*

Paul Ostoya Czechowicz, Diplomvolkswirt, *Professorial Lecturer in Geography*

Sherman Raymond Abrahamson, Ph.D., *Professorial Lecturer in Geography*

*Hendel Walter Westermann, A.M., *Assistant Professor of Geography*

Richard Ernest Murphy, A.M., *Assistant Professor of Geography*

Joseph Lambert Intermaggio, A.M., *Lecturer in Geography*

Jerome Percival Packard, Ph.D., *Lecturer in Geography*

Bachelor of Arts with a major in Geography (Columbian College—Departmental).—Prerequisite: the Arts and Letters curriculum in the Junior College, see pages 14-15. It is strongly recommended that this curriculum include Biology 1, 2; Economics 1-2; History 71-72, and Statistics 91-92. Electives must include Geography 51 and 52.

Required: in addition to the general requirements as stated on pages 77-81, twenty-four credit hours of Geography beyond first-group courses, including Geography 1-3-4, 113, and 114; three credit hours in one or more of the following departments: Botany, Geology, Economics, History, Political Science.

Master of Arts in the field of Geography (Columbian College).—Prerequisite: the degree of Bachelor of Arts with a major in Geography from this University, or the equivalent.

Required: the general requirements as stated on pages 84-87. The thirty hours of required work must include Geography 201-2 and 209-300.

Bachelor of Arts in Education with a teaching field in Geography (School of Education).—Prerequisite: the Geography option, page 161 and the professional courses listed on page 174.

FIRST GROUP

- 51 *Introduction to Geography* (3) Campbell, Abrahamson
A study of place attributes and characteristic patterns and associations of physical and cultural earth features. Morning. (Also offered 1955 summer term.)
Geography 51X, same as 51, offered spring term. Evening.

- 52 *World Regions* (3) Campbell, Abrahamson
The analysis of world regional divisions, description and interpretation of physical/cultural (1954) areas, evaluation of regional differences as they affect the distribution and activities of man. Morning. (Also offered 1955 summer term.)
Geography 52X, same as 52, offered fall term. Evening.

* On leave of absence 1955-56.

SECOND GROUP

- †103-4 *Cartography* (3-3) Murphy
Principles of cartographic drafting; elementary map projections; map and graph planning, design, and construction; uses and interpretation of maps. Prerequisite: Geography 51 and 52. Laboratory fee, \$1.00 term. Saturday.
- 113X *Geomorphology* (3) Quam
The nature and evolution of earth forms, with special emphasis upon relief features of North America. Prerequisite: Geography 51. Evening. Field trips to be arranged.
- 114X *Weather and Climate* (3) Quam
Elementary atmospheric physics, air mass and frontal weather analysis, regional climatology. Prerequisite: Geography 51. Evening. Laboratory to be arranged.
- 125 *Economic Geography: Trade and Transportation* (3) Murphy
The influence of geographic factors on the forms of transportation and upon trade routes and centers. 1955-56 and alternate years. Evening.
- 126 *Economic Geography: Raw Materials* (3) Murphy
Location and migration of raw materials essential to modern technology; position of the United States with regard to such materials. 1955-56 and alternate years. Evening.
- 127 *Economic Geography: Manufacture* (3) Westermann
Location and distribution of manufacturing industries; analysis of factors determining both internal structure and external relationships of selected industries. 1956-57 and alternate years.
- 128 *Economic Geography: Agriculture** (3) Westermann
Analysis of types and distribution of agricultural practices; ecology; character of predominantly agricultural economies. 1956-57 and alternate years.
- 131 *Conservation of Natural Resources** (3) Murphy
Policies and problems of conservation of vital natural resources: soil, water, forests, minerals, fish, wildlife. Prerequisite: Geography 51 and 52. 1955-56 and alternate years. Morning.
- 132 *Land Use** (3) Murphy
Principles of geographic area analysis and land planning. Prerequisite: Geography 51 and 52. 1955-56 and alternate years. Morning.
- 141 *Geography of Settlement* (3) Westermann
The study of the nature and form of settlement, and of population trends and patterns. (Sociology 141, *Population and Migration*, is strongly recommended as an elective for students particularly interested in demography.) 1956-57 and alternate years.

* The following courses are strongly recommended for students particularly interested in the study of settlement, land use, and conservation: Murphy 141-42, *Plant Ecology*; 413, *Ecology*; 414, *Human Geography*; 444, *The Population of North America*; and 445, *Soil*.

- 142 *Urban Geography* (3) Westermann
The study of the location, form, and function of cities. (Sociology 126, *Urban Sociology*, is strongly recommended as an elective for students particularly interested in urban studies.) 1956-57 and alternate years.
- 151 *Economic Geography of the United States* (3) Campbell
A study of the bases of regional economic development; the character of the economic structure of the United States and its relationships with other areas of the world. Morning.
- 152 *Political Geography of the United States* (3) Campbell
A study of the basis of political "regionalism" within the United States and of our political relationships with other nations. Morning.
- 171 72 *Field Geography* (3-3) Quam
Field study methods, training in mapping and analysis techniques for both rural and urban areas. Prerequisite: Geography 51 and 52. Transportation fee \$15.00 a term.
Summer term 1955-56; Geography 171 (3).
- 174 *Map Interpretation* (3)
Map elements and map use—map reading, interpretation and evaluation of maps. Prerequisite: Geography 133-4. (Not offered in 1956-57.)
- 183 *Northwest Europe** (3) Campbell
1956-57 and alternate years.
- 184 *The Mediterranean** (3) Campbell
1956-57 and alternate years.
- 185 *Africa** (3)
Summer term 1955.
- 186 *The Middle East** (3)
(Not offered in 1956-57.)
- 191 *Mobile America** (3) Murphy
1955-56 and alternate years. Afternoon.
- 192 *South America** (3) Murphy
1955-56 and alternate years. Afternoon.
- 195X *Eastern and Southeastern Asia** (3) Fischer
1955-56 and alternate years. Evening.
- 196X *Soviet Union** (3) Czechowicz
1955-56 and alternate years. Evening.
- 197 *The Pacific** (3) Westermann
(Not offered in 1956-57.)

* Required survey. No prerequisite. For students particularly interested in the study of specific countries, courses are offered in the departments of Economics, History, and Political Science. Such courses include: the European Community (E.C.), Economic History and Problems of Latin America, History and Geography of Latin America, Latin American History and Government, Latin American History and Government, Latin American History and Government, Latin American History and Government.

198	<i>Australia*</i> (3) (Not offered in 1955-56)	Westernland
THIRD GROUP †		
1201-2	Seminar: <i>History and Political Geography</i> (3-3) Evening	Cambridge
231	Seminar in <i>Geography: Area Evaluation</i> (3) Evening	Packard
232	Seminar in <i>Geography: Area Planning</i> (3) Evening	Intermar
251-52	Seminar: <i>World Problem Areas</i> (3-3) (Not offered in 1955-56)	
295-96	<i>Research</i> (3-3) Special directed studies. Time to be arranged.	The Study
299-300	<i>Thesis</i> (3-3) Time to be arranged.	The Study

COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above, the University offers the following course especially for students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, Military Economics and Politics Program, and Engineering Administration.

271 *Engineering Geography* (1)

* Regional course. Not prescribed. For students pursuing a degree in Geography, the course is required. For students pursuing a degree in Economics, History, and Political Science, the course is recommended. For example, Economics (Area in Economic History and Political Science), History (Area in Latin American History and Government), and Political Science (Area in Latin American History and Government).
† There must be adequate credit in related or all listed disciplines.

GEOLOGY

—, *Associate Professor of Geology*

—, *Instructor in Geology*

Bachelor of Arts with a major in Geology (Columbia College—Department of Geology).—Prerequisite: the Arts and Letters curriculum in the Junior College, as given 64.

Required: in addition to the general requirements as stated on pages 77-81, at least twenty-four of the required sixty credit hours must be in Geology beyond the first group courses.

Master of Arts in the field of Geology (Columbia College).—Prerequisite: a Bachelor of Arts degree with a major in Geology at this University, or the equivalent.

Required: the general requirements as stated on pages 84-87.

FIRST GROUP

5 *Field Geology* (6)

Field trips to neighboring localities of geological interest, with classroom study. (Not offered in 1955-56.)

21-22 *Physical and Historical Geology* (3-3)

Survey course covering the principles of physiography, geology, and meteorology. (Not offered in 1955-56.)

SECOND GROUP

121-22 *Paleontology* (3-3)

Lectures and laboratory work on classification and structure of fossil invertebrates, vertebrates, and plants, including their use as guide fossils in stratigraphic geology. (Not offered in 1955-56.)

123-24 *Regional Geology of North and South America* (3-3)

Lectures and map work on the physiographic regions of the Western Hemisphere, stressing the relationship between geology and geography and climate. (Not offered in 1955-56.)

125-26 *Regional Geology of the Eastern Hemisphere* (3-3)

A companion with Courses 123-24 and with it comprising a survey of the world. (Not offered in 1955-56.)

THIRD GROUP

215-16 *Seminar* (3-3)

Directed study and presentation by the class and instruction of some phase of geology with review of current literature. (Not offered in 1955-56.)

227-28 *Research* (var.)

Original work on individual problems, including a digest of the published record. (Not offered in 1955-56.)

299-300 *Thesis* (3-3)

(Not offered in 1955-56.)

GERMANIC LANGUAGES AND LITERATURES

Gretchen Louisa Rogers, Ph.D., *Associate Professor of German*
 Wolfram Karl Legner, Ph.D., *Associate Professor of German, Executive Officer*

James Cecil King, Ph.D., *Assistant Professor of German*

Bachelor of Arts with a major in Germanic Languages and Literatures (Columbian College—Departmental).—Prerequisite: the Arts and Letters curriculum in the Junior College; see page 54.

Required: in addition to the general requirements as stated on pages 77-81, German 51-52 and eighteen additional credit hours in German courses above the first group, History 32-42 or the equivalent; six credit hours in Philosophy selected with the approval of the adviser.

Master of Arts in Germanic Languages and Literatures (Columbian College).—Prerequisite: a Bachelor of Arts degree with a major in Germanic Languages and Literatures from this University, or the equivalent.

Required: the general requirements as stated on pages 84-87. The thirty hours of required work must include a thesis in the field of German literature or linguistics; a reading knowledge of French.

Bachelor of Arts in Education with a teaching field in German (School of Education).—Prerequisite: the Education curriculum, pages 64-65.

Required: the German option, page 101, and the professional courses listed on page 104.

FIRST GROUP

- 11-2 *First-year German (3-3)* The Staff
 The essentials of German grammar; translation of daily news. Morning and evening sections. (Also offered 1935 summer term.)
- 31-4 *Second-year German (3-3)* The Staff
 Selections from modern German prose; review of grammar, particularly German 1-2 or two years of high school German. Morning and evening sections. (Also offered 1935 summer term.)
- 9 *German Conversation and Composition (3)* Rogers
 Morning.
- 40 *German Readings for Non-major Students (1)* Legner
 Designed primarily for graduate students preparing for reading examinations. Undergraduates admitted with the permission of the instructor. No academic credit for graduate students. Evening. (Also offered 1935 summer term.)
- 51-52 *Introduction to German Literature (3-3)* Legner, Rogers
 Prerequisite: German 4 or the equivalent. Morning.

SECOND GROUP

- †103-4 *Goethe's "Faust" (3-3)* Legner
 1936-37 and alternate years.

- 131-32 *German Literature of the Eighteenth and Nineteenth Centuries* (3-3) Rogers
The Period of Enlightenment, "Storm and Stress", classicism, romanticism, and realism. 1955-56 and alternate years. Saturday morning.
- 133 *Modern German Drama* (3) Rogers
1956-57 and alternate years.
- 134 *Modern German Fiction* (3) Rogers
1956-57 and alternate years.

THIRD GROUP

- †201-2 *Middle High German* (3-3) Legner
1955-56 and alternate years. Saturday morning.
- 299-300 *Thesis* (3-3) The Staff

HISTORY

Elmer Louis Kayser, Ph.D., LL.D., *Professor of European History*
 Wood Gray, Ph.D., *Professor of American History*
 Howard Maxwell Merriman, Ph.D., *Professor of American Diplomatic History, Executive Officer*
 *Myron Law Koenig, Ph.D., *Professor of American History*
 Roderie Hollett Davison, Ph.D., *Professor of European History*
 William Columbus Davis, Ph.D., *Associate Professor of Latin American History*
 Ronald Bettes Thompson, Ph.D., *Associate Professor of European History*
 Richard Catlin Haskett, Ph.D., *Assistant Professor of American History*

Bachelor of Arts with a major in History (Columbian College—Field of Study).—Prerequisite: the Arts and Letters curriculum in the Junior College, see page 54. Courses must include History 12-42 and 71-72.

Required: the general requirements as stated on pages 77-83 and the grade of "pass" on the History major examination at the end of the senior year.

The major, centered on the study of the rise, development, and spread, and the continuing challenges of Western civilization, is attested by a major examination. Under the guidance of an adviser the student will arrange his program in History to attain a balanced coverage of (1) the rise of civilization in Europe to the eve of the French Revolution, (2) the spread of Western culture throughout the world since the close of the nineteenth century, (3) the historic problems of modern industrial civilization from the beginnings of the Industrial Revolution, and (4) the relations of the major nations of Europe and America in their world setting since the Napoleonic Wars. A six-hour master's seminar in advanced training in fundamental techniques is a required part of each major's program, and a seminar (History 197-201) is offered as a means of integrating the student's understanding of the complexity of Western civilization. For details relating to the administration and content of the major, see the pamphlet on this subject, which is available in the office of the Dean of Columbian College and the Executive Officer of the History Department.

Bachelor of Arts with a major in Latin American Civilization (Columbian College—Field of Study).—Prerequisite: the Arts and Letters curriculum in the Junior College, see page 54.

Required: the general requirements stated on pages 77-83, and the grade of "pass" on the Latin American Civilization major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes the political and social history, the economic development, the governmental structures and international relations, and the principal literary works and writers of the Latin American republics. The Department of History provides a seminar (History 197-201) intended to assist the student in preparing himself for the major examination. For further details, see the pamphlet, which is available in the Office of the Dean of Columbian College.

* On leave of absence 1955-56.

Master of Arts in the field of History (Columbian College)—Prerequisite: the degree of Bachelor of Arts with a major in History from this University, or the equivalent, and the approval of the Department.

Required: the general requirements for the degree, as stated on pages 84-87. Of the twenty-four credit hours of required second- and third-group courses (exclusive of the thesis), at least six must be in third-group history courses; a minimum of six may be in a closely related field outside the Department of History as approved by the Department. Master's candidates are responsible for arranging with instructors of second-group courses for extra work, in order to receive graduate credit for such courses.

Master of Arts in the field of Latin American Civilization (Columbian College)—Prerequisite: the degree of Bachelor of Arts with a major in Latin American Civilization from this University, or the equivalent, and the approval of the Committee on Latin American Civilization.

Required: the general requirements for the degree, as stated on pages 84-87. Course work and the comprehensive examination will embrace political and social history, international movements and international relations, economic development, and principal literary works of Latin America. The thesis may be written in any one of these four fields. All courses must be approved in advance by the Adviser.

Degree of Philosophy (Graduate Council)—See page 92.

Bachelor of Arts in Education with a teaching field in History (School of Education)—Prerequisite: the Entrance Examination, pages 52-56.

Required: the History section, pages 161-172, and the professional studies listed on page 174.

FIRST GROUP

59-60 *The Development of European Civilization* (3-3) Kayser, Thompson

Primarily for freshmen. Fall term: the political, social, economic, and cultural history of the Old World from ancient times to 1748. Spring term: from 1748 to the present. Morning and evening sections. (Also offered 1955 summer term.)

71-72 *The Development of the Civilization of the United States* (3-3) Haskett

Primarily for freshmen. Fall term: the political, social, economic, and cultural history of the United States in their world setting from 1492 to 1865. Spring term: from 1865 to the present. Morning and evening sections. (Also offered 1955 summer term.)

SECOND GROUP*

109 *Thought and Culture of the Western World I. Ancient Civilization* (4) Kayser

Intellectual and social evolution in the Near East, Greece, and Rome; classical art, letters, philosophy, and science. (Not offered in 1955-56.)

*History 109 is a prerequisite for courses 109-110, 111, and 112 through 115. History 110, 111, 112, 113, 114, and 115 are offered in 1955-56. History 116-118 are offered in 1956-57. History 119-121 are offered in 1957-58.

- 110 *Thought and Culture of the Western World II: the Middle Ages and Renaissance* (3) Kayser
Christian thought from Augustine to Thomas Aquinas; humanism and the classical revival; rise of vernacular literatures, the fine arts. (Not offered in 1955-56.)
- 119 *Thought and Culture of the Western World III: from the Reformation through the Age of Reason* (3) Kayser
The growth of Protestant polity and doctrine; the Counter-Reformation; the scientific revival; rationalism. And the Enlightenment; arts and letters. Morning.
- 120 *Thought and Culture of the Western World IV: Intellectual Aspects of the Modern Age* (3) Kayser
The evolution of democratic and social concepts; liberalism and authoritarianism in religion and in politics; the impact of modern science and technology; romanticism and realism. Morning.
- 130 *Nationalism* (3) Kayser
The historical evolution of modern nationalism.
Summer term 1955.
- 145-46 *Russian History* (3-3) Thompson
Fall term: Russia and Eastern Europe 800-1900, with emphasis on the 19th century; spring term: 20th century Russia in its liberal, revolutionary, and totalitarian phases. Morning.
- 147 *Economic History of Europe* (3) Gray
A survey from ancient times to the present day. Evening.
- 148 *Oversea Expansion of Europe* (3) Morrison
International rivalries and the impact of European civilization on Africa and the Pacific basin since 1500, with emphasis on the nineteenth and twentieth centuries. (Not offered in 1955-56.)
- 149-50 *European Diplomatic History* (3-3) Davison
Background of the European state system and of diplomatic practices and relations since the Congress of Vienna, with emphasis on the policies and actions of the great powers and their statements. Fall term: to 1871; spring term: since 1871. Morning and evening sessions. (Also offered 1955 summer term.)
- 151-52 *English History* (3-3) Haskett
A general survey of the development of political, social, and economic institutions of British civilization in the English speaking world. Fall term: to 1700; spring term: since 1700. Evening.
- 151 *Ancient Americans* (3) Davis
A study of the Maya, Aztec, Inca, and other early civilizations of North and South America. Evening.
- 162 *Iberian Background of Latin America* (3) Davis
History of Spain and Portugal, with emphasis on developments leading to the rise and decline of the Spanish and Portuguese empires. Evening.

- 163 *Latin American History: Colonial Period* (3) Davis
Political, economic, social, and institutional developments in Spanish and Portuguese America from the conquest through the wars of independence. Morning.
- 164 *South America since Independence* (3) Davis
Development of the independent South American states in the 19th and 20th centuries. (Not offered in 1955-56.)
- 166 *Mexico and the Caribbean since Independence* (3) Davis
A survey of the republics of Mexico, Central America, and the Caribbean island. Morning. (Also offered 1955 summer term.)
- 171-72 *Social History of the United States* (3-3) Gray
Daily life, institutions, intellectual and artistic achievements of the Agrarian Era, 1607-1841; and the Urban-Industrial Era, 1841 to the present time. Morning. (Also offered 1955 summer term—History 172 (3).)
- 173 *Representative Americans* (3) Gray
A biographical approach to national history. Some fifty significant and pivotal personalities in the development of the United States in government, business, science, religion, journalism, the arts, and social reform. Morning. (Also offered 1955 summer term.)
- 174 *Economic History of the United States* (3) Gray
Main trends in the development of American agriculture, industry, and trade since 1607, with emphasis on tendencies and problems since the Civil War. Evening.
- 175-76 *Political and Constitutional History of the United States* (3-3) Haskett
The processes and conflicts of group interests in America within the political and legal framework. Fall term to the eve of the Civil War; Spring term, the Civil War to 1945. Morning.
- 177 *The South* (3) Gray
Role of the plantation system and slavery; the international cotton; and the problems and progress of the New South. Morning.
- 181-82 *Diplomatic History of the United States* (3-3) Merriman
Tendencies toward isolation, expansion, and collectivizing; disputes with foreign countries and their settlement; and the activities of the American secretaries of state and diplomatic agents. Fall term to 1871; Spring term, since 1871. Evening. (Also offered 1955 summer term—History 181 (3).)
- 183 *Oversea Expansion of the United States* (3) Merriman
The political, economic, social, and cultural life of our outlying possessions. Morning.
- 184 *Canada and the United States* (3) Merriman
The historical background and main trends in the relationship of the two English-speaking peoples of North America. Morning.

- 191-92 *Current History* (1-1) Kayser
Contemporary events in their world setting. Afternoon.
- 193 *History of the Near East* (3) Davison
The Byzantine, Arab, Persian, and Islamic backgrounds of Near Eastern history; the rise and decline of the Ottoman Empire; the situation of European powers in the area; and the Ottoman break-up into the Turkish Republic and other successor states. Morning.
- 195-96 *History of the Far East* (3-3) Thompson
Fall term, the civilizations of China, India, and Japan from the beginning to 1700 A.D. Spring term, the modern Orient under the impact of the West since 1700. Afternoon.
- 197-98 *Protominar in Latin American Civilization* (3-3) Davis, Vazquez, Wythe
Reading course for introduction and review. Open only to students in Latin American Civilization. Time to be arranged.
- 199-200 *Protominar: Reading for the History Major* (3-3) The Staff
Limited to majors in History. Readings and discussions on major trends in the history of Western civilization, including representative selections from the classics of historical literature. Evening. (Also offered 1955-1956 term.)

THIRD GROUP *

- 241-42 *Conference Seminar in Recent European Diplomatic History*† (3-3) Davison
(Not offered in 1955-56.)
- 244 *Reading Course in Modern European History* (3) Thompson
Primarily for graduate students. Time to be arranged.
- 245 *Seminar in Russian and Far Eastern History* (3) Thompson
Evening.
- 247 *Reading Course in Russian and Far Eastern History* (3) Thompson
Primarily for graduate students. Evening.
- 249 *Seminar in European Diplomatic History* (3) Davison
Afternoon.
- 251-52 *Seminar in Latin American History* (3-3) Davis
(Not offered in 1955-56.)

* Approval of the committee is required for registration in every third group course.
† Primarily for Master's students in the School of Government.

- 271-72 *Seminar in the Social History of the United States* (3-3) Gray
Evening
- 275 *Seminar in American Political and Constitutional History* (3) Haskett
(Not offered in 1955-56.)
- 281-82 *Seminar in the Diplomatic History of the United States* (3-3) Merriman
Afternoon
- 287 *Conference Seminar on the Development of the Foreign Policy of the United States** (3)
(Not offered in 1955-56.)
- 291-92 *Seminar* (3-3) The Staff
Prerequisite: approval of the Department. Time to be arranged.
- 294 *Seminar in the History of the Modern Near East* (3) Davison
Evening.
- 299-300 *Thesis* (3-3) The Staff
Required of all candidates for the Master's degree specializing in History. Time to be arranged. (Also offered 1955 summer term.)

* Designed primarily for Master's candidates in the School of Government.

HOME ECONOMICS

Frances Kirkpatrick, A.M., *Professor of Home Economics, Executive Officer*
 Kathryn Mildred Towne, A.M., *Associate Professor of Home Economics*

*Bachelor of Science with a major in Home Economics (School of Education).—*Prerequisite: Home Economics 121-122. In the Junior College, see page 65. The requirements for the degree are stated on pages 156-57 and 174-75.
*Bachelor of Arts in Education with a teaching field in Home Economics (School of Education).—*Prerequisite: the Education curriculum on pages 65-66. The requirements, see special bulletin on Home Economics.

FIRST GROUP

- 1 *Food Selection and Preparation* (3) Kirkpatrick
 Composition, selection, and preparation of food; analysis of recipes, standard products, planning, preparing, serving, and estimating the cost of meals. Material fee, \$10.00. Morning.
- 22 *Clothing: Its Selection, Cost, and Care* (3) Towne
 Clothing selections—the economic, aesthetic, and hygienic aspects, the application of the principles of color and design to individual selection, the care of clothing. Morning.
- 51 *Family Meals* (3) Kirkpatrick
 The choice, purchase, preparation, and service of foods, dietary standards, food habits, and the nutritional needs of the family, problems of purchasing, care, and use of food by the consumer. Material fee, \$10.00. Morning.
- 53x *Family Health and Household Sanitation* (3) Kirkpatrick
 Home hygiene and home care of the sick, the principles of household sanitation in relation to health and disease. Morning.
- 62 *Clothing Construction* (3) Towne
 Techniques of construction suitable for cotton, wool, silk, and man-made fibers; the use of commercial patterns and their alteration; the proper selection of color, design, and fabric. Material fee, \$7.00. Afternoon.
 Home Economics 62x, same as 62, offered fall term. Evening.
- 71 *Costume Design and Fashion Economics* (3) Towne
 Factors determining fashions and effect on cost of clothing; production of the consumer of textiles and clothing; historic costume and its relation to modern dress. Material fee, \$7.00. Afternoon.

- 72x *Household Textiles* (3) Towne
Properties, uses, and tests of the different textile fibers and fabrics and development of judgment and knowledge of standard for the consumer of clothing and home-furnishing material. Material fee, \$7. Afternoon.
- 77 *Marketing* (3)
Purchasing of foods as it relates to the home and to the institution. (Not offered in 1955-56.)

SECOND GROUP

- 102 *Advanced Food Preparation* (3) Kirkpatrick
The application of the fundamental processes of food preparation to a wider range of food materials and various services for different occasions. Material fee, \$6. Morning.
- 106 *Quantity Cookery* (3) The Staff
(Not offered in 1955-56.)
- 123x *Household Finance and Problems of the Consumer* (3) Towne
Economic problems of the family in modern industrial society, family income, income apportionment and household expenditures, laws affecting the home, investments, consumer buying. Evening.
- 143 *Advanced Clothing Construction* (3) Towne
Problems of vesting construction and flat pattern designing. Material fee, \$7. (Not offered in 1955-56.)
- 148 *Food Problems and Demonstration Methods* (3) Kirkpatrick
Factors affecting the preparation of standard products from the experimental viewpoint; principles of demonstration. Material fee, \$6.30. Evening.
- 152x *Nutrition* (3) Kirkpatrick
Lecture course on the principles of normal and abnormal human nutrition. Laboratory work on the calculation and preparation of dietaries. Material fee, \$8. Evening.
- 154 *Diet Therapy* (3)
Study of nutrition as applied to diet and disease. Material fee, \$7. (Not offered in 1955-56.)
- 164 *Child Nutrition* (3) Kirkpatrick
Basic principles in nutrition and growth of the infant, preschool, and school-age child in health and disease. (Not offered in 1955-56.)
- 168 *Institutional Management* (3)
Study of the organization, equipment, and marketing problems of institutions. (Not offered in 1955-56.)

- 171 *House Furnishing* (3) Towne
Home planning from the historic, artistic, economic, and sanitary viewpoints; home furnishings such as linens, dishes, floor coverings, mattresses, etc. Material fee, \$4. Morning.
- 181 *The Child in the Home* (3) Kirkpatrick
Care and development of children; parent-child relationships. Afternoon.
- 192 *The Home, Its Management and Equipment* (3) Kirkpatrick
Home management of the home; distribution of time and energy; problems in the selection, arrangement, and care of equipment. (Not offered in 1955-56).
- 193 *Supervision of Home Management* (3) The Staff
Field work under supervision. Designed to meet requirements of those preparing to teach in federally aided schools. Time to be arranged.
- 195-96 *Special Problems* (3-3) The Staff
Individual investigation or study under the guidance of a member of the staff. Suggested problems are: marketing, tailoring, drapery, and fabric decoration. Program and conferences arranged with an instructor. Time to be arranged.
- 197-98 *Proseminar* (3-3) The Staff
The study of the most recent materials and problems in the various phases of home economics. Evening.

JOURNALISM

Harbridge Colby, Ph.D., *Professor of Journalism, Executive Officer*

Robert Crumpton Willson, A.B., *Assistant Professor of Journalism*

Joseph Marshall Mathias, A.B., LL.B. *The Writer in Journalism*

William Vance Nessler, *Lecturer in Journalism*

William Joseph Brady, A.B., *Lecturer in Journalism*

John Vincent Hinkel, M.S., *Lecturer in Journalism* (Public Relations)

Virginia Inghay Cotton, M.S., *Lecturer in Journalism*

Roger Brooke Farquhar, *Lecturer in Journalism*

SEMINAR LECTURERS

Richard Hollander, Managing Editor, *The Washington Daily News*

James Russell Wiggins, Managing Editor, *The Washington Post and Times Herald*

R. K. M. is Act. with a minor in Journalism, Columbia College—Detroit.

In the field of New Literature—Prerequisite: the Arts and Letters curriculum in the Junior College, including Journalism 71-72 and 81-82; see page 74. It is recommended that derivatives in the Junior College be selected from the following: English 1-2, French 71-72, History 71-72, Political Science 9-11, Psychology 1-2, Speech 1-2, and Speech 1 and 2; 11, or 12.

It is noted that the entire community as stated on pages 77-83. On the same day a second group of students in College 2 was College a minimum of eighteen must be included that students in College 2. College be selected from the following: Page 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958

In the field of Public Relations—Presenting the Arts and Letters curriculum in the *Public Column*, pp. 74-75. Features should include: *Education*, 1-5; 1, 2, or 11, 97-72; *Literature*, 71-72, 81-82; *Psychology*, 1, 2, and *Speech*, 1-5.

Page 11, or 12.

Paragraph 1: The general requirements as stated in pages 77-81. The fifty hours of required courses in Colombian Culture must include the following: Introduction 161, 143, 145, 146, and 147; courses in Business Administration: Finance, History, Economics, and Spanish, or are selected upon the advice of the Journalism Department. It is recommended that Colombian College electives be selected from History 174; Journalism 111, 143, 145, 146, 149, 141, 142, 147, Spanish 131, 137. It is suggested that courses be selected from the required and recommended courses may be permitted with the approval of the Journalism Department.

First Group

71-72 *Survey of American Journalism* (3-3)

Culiv

the newspaper's position in relation to political, social, and economic life, as a public institution and as a private business.

including techniques of gathering and presenting news and of leading opinion, and their effects. Journalism 72, development of news stories from editorial days to the present and their relations to social, literary, economic, and political history. Morning and evening sections.

81-82 *Reporting* (3-3)

Farquhar, Brady

Techniques of newspaper reporting, instruction and practice in modern methods of gathering and presenting news. Some knowledge of typing is desirable. Prerequisite: English 1 or the equivalent. Laboratory fee, \$6 a term. Morning and evening sections.

SECOND GROUP

115 *Newspaper Copy Editing and Make-up* (3)

Nessly

Editing of news items for publication, the copy desk, headlines, make-up, the city editor and his function. Prerequisite: Journalism 81-82 or the equivalent, must be taken concurrently. Saturday morning.

121-22 *Feature Writing* (3-3)

Willson

Instruction and practice in writing of special newspaper and magazine articles for sale, material for which is obtained through interviews and independent investigation. Prerequisite: English 1, 2 or the equivalent. Journalism 121, evening. (Journalism 122 not offered in 1955-56.)

Journalism 121B, same as 121, offered spring term. Morning.

137 *Reporting of National Affairs* (3)

Corten

Training in the coverage and presentation of national news with special attention to Washington correspondence and press association reporting. Afternoon.

138 *Radio and Television News Reporting* (3)

Practical instruction in the collection and broadcasting of radio and television news, based on interviews, (provided by Broadcasting) with Washington representatives on critical items of national and international affairs. Prerequisite: Speech 137, or Journalism 117, or the permission of the instructor. Afternoon.

140 *Pictorial Journalism* (3)

Photographic techniques affecting publication, the illustration and the story angle, standards of judgment in selection and use of good pictures, captions, and editing techniques, composing for effective production. Evening.

142 *Retail Newspaper Advertising* (3)

Retail newspaper advertising management, coordination of newspaper advertising with retail news patterns, a four-color production, composition, production methods. Prerequisite: Business Administration 147 or permission of the instructor. (Not offered in 1955-56.)

143 *Industrial Communications* (3)

Willson

An introduction to the field of corporate journalism. Writing and editing the company magazine. Preparation of annual reports. Editing stockholder publications and external house organs. The prerequisite

tion of employee manuals, sales and training aids, catalogues, and bulletins. Evening.

144 *Business Journalism* (3) Willson

An introduction to the functions and activities of the business press; publishing industry. Writing for the business press. Reporting the news of business and industry, finance, advertising, and marketing. Saturday morning.

145 *Principles of Public Relations* (3) Hinkel

The press and information office, technique of news releases, public addresses at news, promotion of feature material, the problem of public relations in government agencies and commercial establishments. Saturday morning.

146 *Problems in Public Relations* (3) Hinkel

Care studies of successful public relations programs, discussion of public relations procedures and ethics, preparation of specific public relations projects. Prerequisite: Journalism 145. Saturday morning.

151-52 *Editorial Writing* (3-3) Colly

Current events from the standpoint of editorial interpretation, instruction and practice in the writing of editorials and columns on public affairs. Admission by permission of the instructor. It is recommended that History 101 or 102 be taken concurrently with this course. Journalism 151, morning. (Journalism 152 not offered in 1955-56.)

Journalism 151B, same as 151, offered spring term. Evening.

158 *Law of the Press* (3) Mathias

Freedom of the press, censorship, legislative controls, publications as sources of news, copyrights, rules governing speech, libel law and the newspaper business, law of libel, privileged matter, fair comment on public characters, right of privacy. Evening.

LAW

- Charles Sager Collier, A.B., LL.B., S.J.D., *Professor of Law*
 William Thomas Fryer, A.B., LL.B., J.D., *Professor of Law*
 Carville Dickinson Benson, A.B., LL.B., S.J.D., *Professor of Law*
 James Forrester Davison, A.B., LL.B., LL.M., S.J.D., *Professor of Law*
 James Oliver Murdock, Ph.B., LL.B., *Professor of Law*
 Oswald Symister Colclough, B.S., LL.B., LL.D., *Professor of Law*
 John Theodore Fey, LL.B., M.B.A., J.S.D., *Professor of Law, Executive Officer*
 James Ward Morris, A.B., *Adjunct Professor of Law*
 James Robert Kirkland, A.B., LL.B., LL.M., *Adjunct Professor of Law*
 Bolitha James Laws, LL.B., LL.M., LL.D., *Adjunct Professor of Law*
 Conder Caywood Henry, A.B., LL.B., *Adjunct Professor of Law*
 John Wingfield Jackson, B.S., LL.B., *Adjunct Professor of Law*
 Frank Hammett Myers, LL.B., LL.M., *Adjunct Professor of Law*
 John Albert McIntire, A.B., LL.B., *Professorial Lecturer in Law*
 Justin Lincoln Edgerton, A.B., LL.B., *Professorial Lecturer in Law*
 Philip Field Herrick, A.B., LL.B., LL.M., *Professorial Lecturer in Law*
 George Edward Monk, A.B., LL.B., LL.M., *Professorial Lecturer in Law*
 Frederick Bernays Wiener, Ph.B., LL.B., *Professorial Lecturer in Law*
 Charles James Zinn, A.B., LL.B., LL.M., S.J.D., *Professorial Lecturer in Law*
 Robert McKinney Cooper, Ph.M., J.D., *Associate Professor of Law*
 Leroy Sorenson Merrifield, A.B., LL.B., M.P.A., *Associate Professor of Law*
 John Patrick Burke, A.B., LL.B., *Associate Professor of Law*
 Herman Israel Orentlicher, A.B., LL.B., *Associate Professor of Law*
 David Benson Weaver, A.B., LL.B., *Associate Professor of Law*
 Louis Harvey Mayo, B.S., LL.B., J.S.D., *Associate Professor of Law*
 Glen Earl Weston, B.S., LL.B., *Associate Professor of Law*
 Joseph Patrick Driscoll, A.B., LL.B., *Associate Professor of Law*
 William Thomas Madison, Jr., A.B., LL.B., *Associate Professor of Law*
 Joseph Duch, LL.D., LL.B., *Lecturer in Law*
 Milton Paul Kroll, A.B., LL.B., *Lecturer in Law*
 Louis James Harris, A.B., LL.B., S.J.D., LL.M., *Lecturer in Law*
 Eugene William Genesee, B.S.E., M.S., LL.B., *Lecturer in Law*
 William Wolcott Goodrich, LL.B., *Lecturer in Law*
 Vincent Kleinfeld, LL.B., *Lecturer in Law*

Paul Archibald Rose, I.L.B., *Lecturer in Law*

Herbert Joseph Liebesny, J.D., *Lecturer in Law*

John Alexander Kendrick, A.B., I.L.B., *Clerk of the Trial Practice Court*

Dudley Graham Skinker, I.L.B., *Associate Clerk of the Trial Practice Court*

For the requirements for the degree of Bachelor of Laws, Joint Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (Joint Law Practice), and Doctor of Juris Doctor, see pages 112-22, 143-54.

FIRST YEAR

101 *Legal Method and Legal System* (4) Fryer, Benson, Davidson, Burke, Webster

Introduction to study of substantive and procedural law dealing with basic concepts. Training in method and technique of case law. Based on cases, mostly in state and federal cases, followed by practice in the use of law books and legal writing. Importance of language in law, legal reasoning, statutory interpretation, and use of precedents. Study the doctrine of stare decisis, law of the case, and res judicata. Background development of Anglo-American legal system; organization of the judiciary and the bar, stressing enforcement of ethical standards. Fryer and Benson, *Cases on Legal Method, Cases on Legal System*, 2 vol. ed. 1952. Morning and evening sections. (Also offered 1953 summer term.)

Law 111X, same as 111, offered spring term. Morning and evening sections.

111-12 *Contracts I, II* (4-2) Mayo, —

Scope of protection afforded contracts; specific performance of contracts; other than legal transactions; damages, restitution. Mutual consent, offer and acceptance, promissory estoppel, mistake, information, third evidence rule. Consideration, third party beneficiaries, assignments, novations, Statute of Frauds. Morning and evening sections.

121 *Criminal Law and Procedure* (4) Murdock, Cooper, Burke

Origin and purposes of criminal law; elements of criminal liability; mental elements; solicitation, attempt, and conspiracy; crimes against the person; against property; and against both; statutory offenses; criminal procedure, with consideration of Federal Rules of Criminal Procedure. Morning. (Also offered 1953 summer term.)

Law 121X, same as 121, offered spring term. Evening.

131 *Personal Property* (2) Fryer, Mallison

Concepts of property and ownership; possession; finding; bailment; loss and theft; acquisition of title by long sale purchase, adverse possession, succession, testament, intestacy, distribution of a judgment and gift. Morning and evening sections. (Also offered 1953 summer term.)

Law 131X, same as 131, offered spring term. Evening.

138 *Real Property* (4)

Benson, _____

Historical background of the law of estates and conveyances; adverse possession; joint tenancy; concurrent estates; easements; profits; covenants, and equitable servitudes; natural rights. Morning. (Also offered 1955 summer term.)

Law 138x, same as 138, offered fall term. Evening.

142 *Torts* (4)

Merrifield

Intended and unintended interference with the person or tangible things; defamation of the person; malicious prosecution. Morning and evening sections.

150 *Constitutional Law* (4)

Collier, Mallison

Historical introduction, judicial approach and methods, doctrine of the separation of powers, powers of the National Government, the federal system, and relation of federal and state courts. Morning and evening sections.

SECOND YEAR

205 *Civil Procedure* (4)

Burke

Function and composition of pleadings, including their relation to proof. Emphasis on legal process, as controlled by statute and court rules and the Federal Rules of Civil Procedure. Morning and evening sections. (Also offered 1955 summer term.)

208 *Evidence* (4)

Feyer

Functions of court and jury; witness; hearsay; opinion and circumstantial evidence; proof of authenticity and content of writings. Morning and evening sections. (Also offered 1955 summer term.)

209-10 *Conveyances and Wills* (2-2)

Land contracts, mortgages, mortgages, recording, formation and revocation of wills, estate and intestate succession. Morning and evening sections. (Also offered 1955 summer term.)

214 *Legal Accounting* (2)

Fey

A study of elementary accounting principles and techniques, with application of accounting principles to legal problems. Morning and evening sections. (Also offered 1955 summer term.)

218x *Local Government Law* (2)

Mallison

Types and structure of municipal, county, and special purpose local governmental units; intergovernmental relations; regional planning and development; lawmaking by local bodies; community planning and development; local responsibility of local governmental units. Evening.

223 *Domestic Relations* (2)

Mallison

Marriage, attachment, and divorce; rights of husband and wife; rights of parent and child; infants. Morning and evening sections. (Also offered 1955 summer term.)

247 *Commercial Paper* (4)

Orentlicher

Use of exchange, promissory notes and checks, especially under the Negotiable Instruments Law. Morning and evening sections.

258 *Commercial Transactions* (4) Orentlicher

The law relating to the sale and distribution of goods, and to the security financing devices utilized in this connection, with particular attention to the effect of uniform laws. Morning and evening sections.

261 *Agency-Partnership* (4) Cooper

Master and servant (status of agent), independent contractor, nature of agency relation, actual authority, parties (disclosed and undisclosed principals), branch and transactions, notice, ratification. Formation of partnerships, partnership property, rights and duties of partners under so nature and enforcement of the partnership obligation, dissolution of the partnership, actions by and against partners. Morning and evening sections.

273 *Corporations* (4) Weaver

Legal requirements as to contributions of capital, powers and rights of corporation, corporate officers, and shareholders. Morning and evening sections. (Also offered 1955 summer term.)

THIRD YEAR

303 *Administrative Law* (4) Davison

The process of the administrative process in the operation of government, including the status of administrative personnel, administrative hearings, judicial review of administrative action, delegation, and quasi-judicial proceedings as relating to federal administrative agencies, Division and Generalized Cases on Administrative Law, Evening. (Also offered 1955 summer term.)

Law 3-33, same as 303, offered spring term, Morning.

308 *Brief Writing and Oral Argument* (2) Wiener

Exposition and study of the basic techniques of written and oral legal argumentation. Each student will be required to write, as a term paper, a brief presenting contentions based on the actual record in an unadorned case. Evening.

309 *Suretyship* (2) Orentlicher

The law of suretyship, especially in the context of accommodation credit and commercial and financial practices, with attention also to informal and non-commercial suretyship relations and the place of suretyship principles in the solution of legal problems generally. Evening.

312 *Restitution* (2) Burke, Orentlicher

Remedies at law and in equity for restitution of benefits conferred, especially as based on the concept of unjust enrichment. Evening.

Law 312A, same as 312, offered fall term. Morning.

315X *Conflict of Laws* (4)

Study of cases involving foreign elements; principles of jurisdiction and limitations upon its exercise; procedure, torts, workmen's compensation, contracts, property, family law, administration of estates, business associations. Morning and evening sections.

317 *Creditors' Rights* (4)

Resources of secured creditors, judgments, fraudulent conveyances, creditors' agreements, equity and statutory recoveries, and bankruptcy. The general approach is that of law administration.
Summer term 1955

321-22 *Current Decisions* (2-2)

Davison, Weston

Required of, and limited to, members of the student staff of the Law School. Time to be arranged.

324 *Federal Jurisdiction* (2)

Cooper

Constitutional and statutory origin of federal courts, cases arising under the law and the Constitution, diversity of citizenship, jurisdiction, removal procedure and jurisdiction, limitations on federal jurisdiction, state and federal conflicts, substantive law applied in federal courts. McCordick and Chaulsourn, Cases in Federal Courts. Monroe

Law 324, held in 324, offered fall term. Evening

326 *Insurance* (2)

Mayo, Driscoll

The insurance business in life, property, and other risks. Evening
(Also offered 1955 summer term.)

327X *International Law* (4)

Murdoch

Origin, scope, sources, and authority, the international community, jurisdiction, organization (the United Nations), nationality, territorial jurisdiction, treaties, diplomatic and consular agents, state responsibility and international claims, peaceful settlement of disputes. Monroe and evening sessions.

329 *Labor Law* (4)

Merrifield

Laws applicable to strikes, picketing, boycotts, etc.; organization and representation of employees; negotiation of collective bargaining contracts; disputes and arbitration relations; settlement of wage disputes; arbitrations, mediation, conciliation. Cases, legislative and administrative materials readings. Morning and evening sessions.

331 *Labor Arbitration* (2)

Merrifield

Labor arbitration and collective bargaining. The role of the law in the creation and administration of collective labor agreements; practices, procedures, and substantive norms in labor arbitration. Evening

333 *Legislation* (4)

Mallory

The legislative process, with particular emphasis on its operation in the federal and state governments; legislative organization and procedure; kinds of statutes; statutory interpretation. Monroe. Also offered 1955 summer term.

335-36 *Trial Practice
Court* (2-2)

Laws, Morris, Kirkland, Edgerton
Myers, Jackson, Herrick, Mack
Kendrick, Sklarke

Trial of assigned cases, trial tactics and techniques; practice and court room procedures pursuant to Federal Rules.
To be taken in the senior year. Prerequisite: Law 205 and 206.
Morning and evening sessions.

337 *Future Interests* (2)

Benson

Future interests at common law and under modern statutes, construction of limitations, powers of appointment, rule against perpetuities. Evening.

Law 337X, same as 337, offered spring term. Morning.

340 *Constitutional Interpretations* (4)

Cedlier

Advanced course in constitutional law. The Constitution and constitutional tradition, doctrines of limited government, separation of powers, implied limitations on legislative power, and significance of "due process" in current constitutional developments. Introduction to comparative constitutional law, with studies in the constitutional law of selected states of the Union. (Not offered in 1954-55.)

345 *Substantive Patent Law** (2)

Harris

Substantive patent law, patentability, revocation, use, and enforcement of patents. Evening.

346 *Patent Office Practice** (2)

Rose

Rules of practice, actual and constructive examination. Evening.

347-50 *Patent Trial Practice Court** (2-2)

Henry, Genesee

Practice before the United States Court of Customs and Patent Appeals, the District Court of the United States for the District of Columbia, and the Court of Appeals for the District of Columbia involving this issue: Sections 342 and 343 of U.S.C. Title practice before the United States courts in infringement. Evening.

This course may be elected instead of Law 345 or to study the Trial Practice Court movement. Both courses may not be counted toward a degree.

351X *Public Utilities* (2)

Fryer

Regulation by administrative agencies; procedure with power fields, dealing primarily with services required and determination of rate of return based on "cost of investment" doctrine. Study of techniques employed in original proceedings and nature of judicial review. Examination of public utility regulatory national trends over distribution of electricity and natural gas. Evening.

355 *Government Contracts I* (2)

McIntire

A consideration of the basic powers of the Federal Government to enter into contracts, the nature and construction of such contracts, formal and substantive aspects of Government procurement, including administrative and legislative policy and procedures, forms of contracts, standard clauses, advanced bid procedures, claims, negotiated contracts, modification of contracts, remedies on contractual claims. Evening.

356 *Government Contracts II* (2)

McIntire

Special problems in Government contracts, including adjustments and relief, award by contract for modification of industrial resources, special relief provisions, efforts toward unified procurement activity, pro-

* Patent law students should take Law 345 and Law 346 immediately in the fall term and Law 347 and Law 350 subsequently in the spring term. Law 345 may be taken only by students who are taking or have taken Law 346.

cedure for prosecuting claims under Government contracts, attempts at price, cost, or profit control; termination. Evening.

369 *Jurisprudence* (4)

History of jurisprudence; schools of jurists, particularly the nineteenth century schools; sociological jurisprudence; theories of justice; the nature of law, law and morals; law and the state; the scope and subject matter of law, sources and forms of law; the traditional elements; analysis of general legal concepts. Evening.

Collier

373 *Taxation* (2)

Introductory course on basic concepts of federal tax system. Attention given to state inheritance and income taxes. Problems of jurisdiction to tax, construction of tax statutes, methods of judicial review of administrative actions in the tax field, modern excise taxes on business concerns. Morning.

Collier

Law 3735, same as 373, offered spring term. Evening.

374 *Taxation—Federal Estate and Gift* (2)

Specific problems in federal estate and gift taxation, with consideration of relevant state inheritance tax problems. Morning and evening sections.

Driscoll

375 *Taxation—Federal Income* (4)

A study of the federal income tax, including construction of statutes, practice and procedure, and legislative policy in the development of the income tax structure. Morning and evening sections. (Also offered 1955 summer term.)

Fey, Driscoll

377 *Unfair Trade Practices* (4)

Unfair trade practices at common law and under state and federal statutes. Trade-marks and trade names, including Trade-Mark Act of 1946. Misrepresentation. False advertising at common law. Fair Trade Commission jurisdiction over misrepresentation practices and remedies. Debarment of competitor's goods and business methods. State Fair Trade Acts (under prior institutional provisions). State and Federal Robinson-Patman Act. State statute prohibiting sales below cost. Including branch of consumer protection. Misleading business acts constituting unfair competition with advertising business relations. Oppression. Unfair Trade Practices, Cases, Comments and Materials (1955). Morning and evening sections.

Weston

378 *Federal Anti-Trust Laws* (4)

Reviewers of trade at common law. Public policy under Sherman Anti-Trust Act of 1890 and Federal Trade Commission and Clayton Acts, including merger, consolidation, and monopoly. Law Against Unfair Competition. Cartelizing agreements, trade associations, restraint of trade. Specific practices such as resale price maintenance, exclusive price systems, exclusive arrangements and tying devices. Trade secrets. Patents and copyrights under antitrust laws. Resale. Oppression. Cases on Federal Anti-Trust Laws. Evening.

Weston

381 *Trusts* (4)

Creation, administration, enforcement, termination. Gifts to and of third persons. Resulting and constructive trusts.

Weaver

Ladd

Rosen

Cases on *Times*, 2d ed. Morning and evening sections. (Also offered 1955 summer term.)

- 383 *Military Law and Jurisdiction* (2) Winter
Survey of military jurisdiction; military law proper, including military martial jurisdiction and personnel law; discipline; and also that military government; martial law; laws of war and treatment of prisoners. 1946-47 and alternate years.

- 386 *Aeronautic Law* (2)
Provision before Civil Aeronautics Board; legal problems arising in connection with air transportation and aeronautic international conventions and conventions. (Not offered in 1955-56.)

- 388 *Admiralty* (2) Coldough
Federal and state jurisdiction; jurisdiction over waters, craft, property, torts, crimes, in navigable waters, etc.; laws applicable to maritime waters and maritime liens. *Sovereign and Healy, Cases in Admiralty*. Evening.

- 391 *Regulation of Communication Media* (2) Mayo
An examination of the legal aspects relating to regulatory structure in the control of mass communication: the representative system plan; and administrative control of the operational structure of the mass media and the pattern of control provided by government, private enterprise, and various community group; appraisal of the regulatory effect of various regulatory techniques for controlling mass media; these various media regulatory will be placed on the structure of the Federal Communications Commission. Evening.

GRADUATE COURSES

- 401X *Administrative Law Seminar* (2) Davis
Group study of specific problems in administrative law. Evening.

- 458 *Legal Problems in Modern Methods of Warfare* (2) MaEgan
The contemporary international law of war, the legal aspects of modern methods of exercising coercion (economic, political, psychological, and military); the conduct and restriction of hostilities; the legal problems of atomic, biological, and chemical weapons; war crimes. Evening.

- 468 *Regulation of Securities and Securities Markets* (2) Kroll
A study of some key federal laws governing the offering and distribution of securities in the United States; the securities market and the securities industry; the securities market and the securities industry; the securities market and the securities industry. Particular emphasis will be given to statutes administered by the Securities and Exchange Commission. 1946-47 and alternate years.

- 410 *Labor Standards and Social Security Legislation* (2) Merrifield
Legal problems arising under federal and state statutes dealing with labor standards and social security. Particular emphasis is placed upon the regulation of wages and hours, workers' compensation, and insurance against unemployment and old age. (Not offered in 1955-56)
- 414 *Control and Use of Atomic Energy* (2) Mayo
Various legal problems involved in the control and use of atomic energy will be examined including the Atomic Energy Act, the policy making from the present department structure, the security problems of supplying atomic military information, the implications in respect to industrial control and use, and legal means of protecting personal interests against the possible consequences of atomic warfare. Evening
- 415 *Comparative Law* (4) Murdoch
Historical and comparative study of the fundamental principles of the Roman and modern Civil Law (law of South and Central America and most of continental Europe); comparative study of selected legal institutions to exemplify significant differences between the civil and common law systems in source materials and in method and procedure in the solution of legal problems. Evening
- 416 *Evidence and Trials Seminar* (2) Fryer
Study of selected problems involving presentation of documentary proof and expert testimony in connection with the reforms made by the Uniform Rules of Evidence and recent developments in the field of human evidence, evidence and alternate facts. Evening
- 417 *Legislative Drafting* (2) Zinn
Advanced instruction and practice in legislative drafting. Evening
- 421 *Constitutional Law Seminar* (2) Collins
Group study of contemporary problems in constitutional law. Evening
- 423X *Criminal Practice and Administration* (2) Cooper
Group study of the fundamental aspects of criminal procedure with special reference to practice before the District of Columbia and federal courts; the law of arrest, searches and seizures, and the function of the preliminary examination and grand jury; the theory of indictments, trial procedure, and the order of trial procedure. Time to be assigned.
- 425 *Law of the Near East* (2) Liebman
A study of the law of the Arab countries including the basic principles of the Islamic law, an analysis of the present day civil and commercial law, the influence of the Western law on the laws of the Arab countries. Evening
- 427 *World Law* (2) Collins
The United Nations as a basis of international law; a study of international law. Evening

- 432 *International Comparative Law Seminar (2)* Murdock
Group study of contemporary problems in international and comparative law. Evening.
- 437 *Monetary Law (2)* Dachs
Introductory survey of the principles of public law by which money is administered, relating particularly to the Federal Reserve System; the legal character of money and of monetary obligations; legal tender; the "gold standard" rule and its limitations; protective clauses (gold, silver, and other clauses). Particular emphasis will be given to the law relating to foreign money; money of contract; money of payment; conversion; rate of exchange; problem of laws problems. (Not offered in 1958-59.)
- 451X *Trade Regulation Seminar (2)* Werten
Group study of current problems relating to unfair trade practices and federal antitrust laws. Evening.
- 471 *Taxation Seminar I (2)* Driscoll
Group study of special problems and recent developments in federal taxation relating to corporations. Evening.
- 472 *Taxation Seminar II (2)* Driscoll
Group study of special problems and recent developments in federal taxation relating to partnerships, trusts, estates, and individuals. Evening.
- 476 *Estate Planning Seminar (2)* Weaver
Consideration of the problems involved in planning an effective and economical gift distribution of property interests. Typical estates, large, large and small, will be considered in the light of the results commonly sought by the donor and the techniques and restrictions suggested by the law of property, wills, future interests, succession, and federal and state taxation. Evening.
- 478 *Labor Law Seminar (2)* Merritt
Group study of contemporary problems in labor law. Evening.
- 479 *Food and Drug Law (2)* Goodrich, Kleinfeld
A lecture and discussion course dealing with the Federal Food, Drug, and Cosmetic Act and governmental controls thereunder. Both government and industry viewpoints are considered. Evening.
- 471 *Research in Public Law (2)* The Staff
Research in public law under supervision of a member of the Faculty. Time to be arranged.
Law 471X, same as 471, offered spring term. Time to be arranged.
- 473 *Research in Patent, Trade Mark, and Copyright Law (2)* Harrell
Research in patent, trademark, copyright, and related systems, or law under supervision of a member of the Faculty and in cooperation with the Patent, Trade Mark and Copyright Foundation. Time to be arranged.
Law 473X, same as 473, offered spring term. Time to be arranged.

MATHEMATICS

James Henry Taylor, Ph.D., *Professor of Mathematics*
 Francis Edgar Johnston, Ph.D., *Professor of Mathematics*
 Florence Marie Mears, Ph.D., *Professor of Mathematics*
 Nels David Nelson, Ph.D., *Associate Professor of Mathematics, A.M.*
Executive Officer
 Louis William Tordella, Ph.D., *Lecturer in Mathematics*
 Earl Larkin Williams, A.M., *Lecturer in Mathematics*

*Bachelor of Arts or Bachelor of Science with a major in Mathematics (Columbian College—Departmental).—*Proceedings of the Arts and Letters of the Senate (mathematics department), in the Junior Catalogue of 1937-38, page 101.

Required: In addition to the general requirements as stated on page 101, must have credit hours of Mathematics of approved course and third entry course.

*Master of Arts or Master of Science in the field of Mathematics (Columbian College).—*Proceedings of the Arts and Letters of the Senate (mathematics department), with a major in Mathematics at this University, on the appropriate page.

Required: the general requirements as stated on page 101-102.

*Doctor of Philosophy (Graduate Council).—*See page 101.

*Bachelor of Science in Engineering with an option in Mathematics (School of Engineering and Applied Sciences).—*See page 101.

*Bachelor of Arts in Education with a teaching field in Mathematics (School of Education).—*Proceedings of the Education committee in the Junior Catalogue page 101-102.

Required: the Mathematics survey, page 102, and the professional course and on page 104.

First Group *

3 College Algebra (3)

Exponents and logarithms, linear equations, complex numbers, quadratic equations, binomial theorem, the theory of equations, determinants, matrices, and the binomial theorem, permutations, combinations, probability, derivatives, integrals. Prerequisite: one year of high school algebra and one year of trigonometry. (Approved 1933 session, 1934-35.)

Mathematics for use as a liberal science course. Minimum and maximum credits.

The Staff

4 Plane Trigonometry (3)

Prerequisite: two years of high school algebra and one year of high school geometry, or Mathematics 4 for equivalent preparation and for Minimum and maximum credits. (Approved 1933 session, 1934-35.)

Mathematics for use as a liberal science course. Minimum and maximum credits.

The Staff

* The following study is necessary a previous for some study of the student's course in Mathematics for the University for a higher scientific study.

- 12 *Analytic Geometry* (3) The Staff
Prerequisite: Mathematics 3 and 6, or two years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry. Morning and evening sections. (Also offered 1955 summer term.)
Mathematics 12X, same as 12, offered fall term. Morning and evening sections.
- 19 *Differential Calculus* (3) The Staff
Prerequisite: Mathematics 12. Morning and evening sections. (Also offered 1955 summer term.)
Mathematics 19X, same as 19, offered spring term. Morning and evening sections.
- 20 *Integral Calculus** (3) The Staff
Prerequisite: Mathematics 19. Morning and evening sections. (Also offered 1955 summer term.)
Mathematics 20X, same as 20, offered fall term. Morning and evening sections.

SECOND GROUP*

- 102X *Fundamental Concepts of Mathematics* (3) Nelson
Evening.
- 103 *Calculus and Differential Equations* (3) The Staff
Morning and evening sections.
Mathematics 103X, same as 103, offered spring term. Morning and evening sections.
- 112 *Mathematics for Engineers and Scientists* (3) Johnston
Topics from advanced calculus: partial differential equations, vector analysis, and integral calculus. Prerequisite: Mathematics 112 or 103. Evening.
- 123X *Theory of Equations* (3) Nelson
Evening.
- 125X *Advanced Algebra* (3) Johnston
Morning.
- 126 *Advanced Analytic Geometry* (3) Taylor
Evening.
- 132X *Differential Equations* (3) Nelson
Evening.
- 134 *Introduction to Boundary Value Problems* (3) Taylor
Prerequisite: Mathematics 131 or 132.
Summer 1956-1957.
- +135-36 *Projective Geometry* (2-2)
(Discontinued in 1955-56.)

* Mathematics and mathematics-related courses are listed in the following pages.

139	<i>Advanced Calculus</i> (3) Evening	Meats
140	<i>Introduction to Analysis</i> (3) Prerequisite: Mathematics 100. Evening	Meats
141	<i>Introduction to Infinite Series</i> (3) (Not offered in 1955-56)	
167	<i>Fourier Series and Spherical Harmonics</i> (3) Prerequisite: Mathematics 111. (Not offered in 1955-56)	Taylor
171	<i>Vector Analysis</i> (3) Evening	
THIRD GROUP		Not
202	<i>Mathematical Logic</i> (3) Evening	
220	<i>Theory of Numbers</i> (3) (Not offered in 1955-56)	Johnson
†237-38	<i>Theory of Functions</i> (3-3) Evening	
242	<i>Infinite Series</i> (3) (Not offered in 1955-56)	Taylor
240	<i>Ordinary Differential Equations</i> (3) Evening	
250	<i>Integral Equations</i> (3) (Not offered in 1955-56)	
†251-52	<i>Theory of Functions of a Real Variable</i> (3-3) (Not offered in 1955-56)	
255	<i>Differential Geometry</i> (3) (Not offered in 1955-56)	
257	<i>Theory of Groups</i> (3) (Not offered in 1955-56)	
265-66	<i>Modern Algebra</i> (3-3) (Not offered in 1955-56)	Taylor
268	<i>Calculus of Variations</i> (3) Evening	Taylor
270	<i>Tensor Analysis</i> (3) Summer term 1955	
277	<i>Partial Differential Equations</i> (3) (Not offered in 1955-56)	

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|---------|-------------------------------------|-----------|
| 278 | <i>Introduction to Topology</i> (3) | |
| | (Not offered in 1955-56.) | |
| 295-96 | <i>Reading and Research</i> (3-3) | The Staff |
| | Time to be arranged | |
| 299-300 | <i>Thesis</i> (3-3) | The Staff |

MECHANICAL ENGINEERING

- Benjamin Carpenter Crickshanks, B.S. in M.E., *Professor of Mechanical Engineering, Executive Officer*
- Jack Edward Walters, M.S. in E.E., Ph.D., *Professor of Engineering Administration*
- Victor Szabolcs, Dr. Eng., *Professional Lecturer in Mechanical Engineering*
- Glen Darwin Camp, Ph.D., *Professional Lecturer in Engineering Administration*
- Robert Irving Scharlach, Sc.D., E.E., *Professional Lecturer in Engineering Administration*
- Gilbert Chester Jacobs, B.S. in C.E., M.B.A., LL.B., *Professional Lecturer in Engineering Administration*
- Kenneth McClure, M.S., LL.B., *Professional Lecturer in Engineering Administration*
- Reynolds Stone Poole, B.S., *Professional Lecturer in Engineering Administration*
- Robert Berchery, Ph.D., *Professional Lecturer in Mechanical Engineering*
- Robert Gay Trumbull, B.S. in C.E., *Associate Professor of Mechanical Engineering*
- Charles Edward Greeley, B.S. in M.E., *Associate Professor of Mechanical Engineering*
- John Kaye, M.S. in M.E., *Associate Professor of Mechanical Engineering*
- Paul Arthur Galtier, B.M.E., M.S., *Associate Professor of Mechanical Engineering, Lecturer in Mechanical Engineering*
- Bernard Bernstein, B.M.E., M.S., *Lecturer in Mechanical Engineering*
- Frank Joseph Powlich, Jr., M.S., *Lecturer in Mechanical Engineering*
- Harold Barton Simpson, A.M., *Lecturer on Engineering Administration*
- George Bott, M.S., *Lecturer on Engineering Administration*
- Richard Edward Neerman, B.M.E., *Associate in Mechanical Engineering*

Graduate in Mechanical Engineering (School of Engineering)—See page 131-133 and 144-145 for statement of requirements.

Master of Science in Engineering (School of Engineering)—See page 146-147 for statement of requirements.

Master of Engineering Administration—See page 148-149.

Mechanical Engineer (School of Engineering)—See page 149-150 for statement of requirements.

FIRST GROUP

- 1 *Engineering Survey and Orientation* (1) Cruickshanks and Staff

Open to freshmen only. Morning and evening sections.

- 2 *Mechanical Drawing* (2) Trumbull, Greeley, Neahrman
Drawing room fee, \$5. Drawing (6 hours)—afternoon and evening sections.

- 3 *Descriptive Geometry* (2) Trumbull, Greeley, Neahrman
Drawing room fee, \$5. Drawing (6 hours)—afternoon and evening sections.

- 7 *Machine Drawing* (2) Trumbull
Prerequisite: Mechanical Engineering 3 and 4. Drafting room fee, \$5. Drawing (6 hours). 1955-56 and alternate years, afternoon; 1957-58 and alternate years, evening.

- 8 *Mechanism Drawing* (2) Trumbull
Prerequisite: Mechanical Engineering 3, 4, and 14. Prerequisite or concurrent instruction: Mechanical Engineering 14. Drawing room fee, \$5. Drawing (6 hours). 1955-56 and alternate years, afternoon; 1957-58 and alternate years, evening.

- 13-14 *Mechanism* (2-2) Trumbull, Cruickshanks
Prerequisite: Mathematics 19. Prerequisite or concurrent instruction: Mathematics 26. Morning and evening sections.

SECOND GROUP

- 11-12 *Thermodynamics* (3-3) Cruickshanks
With preliminary study of laws of heat transmission. Prerequisite: Junior status. Morning and evening sections.

- 15-16 *Mechanical Laboratory* (2-2) Greeley
Calibration of instruments; calibrating, testing of pump systems, exothermic combustion system, and refrigerating machines. Engineering principles not treated. Mechanical Engineering 114 prerequisite. Mechanical Engineering 114 Electrical Engineering 10. Prerequisite or concurrent instruction: Mechanical Engineering 114, 119. Mechanical Engineering 116 prerequisite: Mechanical Engineering 115; prerequisite or concurrent instruction: Mechanical Engineering 112, 14. Laboratory fee, \$10 a term. Laboratory (2 hours). Morning and evening sections.

- 126 *Methods of Manufacture* (2-2) Greeley

Pattern practice, forging, welding, machine tools, inspection, factory processes. Inspection 119a required. Prerequisite: Mechanical Engineering 8 and 14; Civil Engineering 26. Morning and alternate years, morning; 1956-57 and alternate years, evening.

- 227-28 *Machine Design* (2-2) CRAFTON
With mechanical consultation and design periods (6 hours). Prerequisite: Mechanical Engineering 7, 8, and 116; Civil Engineering 26.

- 135 and 140. Drafting room fee, \$5 a term. 1955-56 and alternate years, evening. 1956-57 and alternate years, afternoon.
- 129-30 **Power Plants (3-3)** Cruckshanks
Study of design, layout, installation, and operation of power plants and equipment, with emphasis on heat transmission and insulation. Prerequisite: Mechanical Engineering 112. 1955-56 and alternate years, evening. 1956-57 and alternate years, morning.
- 131-32 **Heating, Ventilating, Air Conditioning, and Refrigeration (2-2)** Powlitch
Principles and applications. Prerequisite: Mechanical Engineering 112. Civil Engineering 20 and 115. 1955-56 and alternate years, afternoon. 1956-57 and alternate years, evening.
- 133 **Combustion Engines (2)** Greeley
Study of spark-ignition and compression-ignition engines, combustion performance, fuels, knock, supercharging and combustion charts. In operation, 1954 through. Prerequisite: Mechanical Engineering 112. 1955-56 and alternate years, morning. 1956-57 and alternate years, evening.
- 139 **Fluid Dynamics (3)** Mason
Theory and application of fluid dynamics. Prerequisite: Mechanical Engineering 112. Civil Engineering 116. 1955-56 and alternate years, evening. 1956-57 and alternate years, morning.
- 140 **Mechanical Vibrations (3)** Betchley
Inertia effects, balancing, vibration phenomena. Prerequisite: Mechanical Engineering 7, 8, and 111. Civil Engineering 140. 1955-56 and alternate years, evening. 1956-57 and alternate years, morning.
- 141-42 **Management Problems (2-2)** Kaye
Organization of an industrial enterprise, the handling and planning of men. 1955-56 and alternate years, evening. 1956-57 and alternate years, morning.
- 5189-90 **Practicum in Mechanical Engineering (1-1)** Betchley
Prerequisite: Speech 1, senior status. See 1000.

THIRD GROUP

- 201 **Instrumentation (3)** Crafton
Theory of measurement and instrumentation systems. Physical principles involved in research and commercial instrumentation. Design problems. 1956-57 and alternate years.
- 202 **Advanced Dynamics of Machinery (3)** Szekely
Free, damped, and forced vibrations of mechanical systems. Inertia response of elastic systems. Selected topics in vibration isolation and control. 1955-56 and alternate years. Evening.
- 203 **Advanced Fluid Dynamics (3)** Mason
Advanced dynamics of incompressible and compressible fluids in internal and boundary layer flows. 1955-56 and alternate years, morning.

- 204 *Heat Transfer Thermodynamics* (3) Bernstein
Advanced problems in compression of gases and liquids, conduction,
Heat transfer problems involving radiation, convection, conduction,
evaporation, and condensation. 1956-57 and alternate years.
- 217-18 *Seminar in Engineering* (1-1) Mason
Time to be arranged.
- 299-300 *Thesis* (3-3) The Staff

ENGINEERING ADMINISTRATION

The School of Engineering also offers the following courses primarily for candidates for the degree of Master of Engineering Administration. Other courses in this program are listed under the departments of Accounting, Business Administration, Geography, and Psychology.

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|-----------------------------------|---|
| Engineering Administration 191 | <i>Engineering Law</i> (3) |
| Engineering Administration 205 | <i>Engineer and Society</i> (3) |
| Engineering Administration 211-12 | <i>Communication</i> (3-3) |
| Engineering Administration 251 | <i>Management of Research and Development</i> (3) |
| Engineering Administration 252 | <i>Production and Maintenance Management</i> (3) |
| Engineering Administration 260 | <i>Statistics, Quality Control, and Standardization</i> (3) |
| Engineering Administration 261 | <i>Economic Analysis in Engineering Planning</i> (3) |
| Engineering Administration 271 | <i>Operations Research</i> (3) |
| Engineering Administration 272 | <i>Operations Research—Problems</i> (3) |
| Engineering Administration 291 | <i>Problems in Engineering Administration</i> (3) |

MEDICINE

- Walter Andrew Bloodorn, A.M., M.D., Sc.D., *Professor of Medicine*
 Thomas McPherson Brown, A.B., M.D., *Professor of Medicine, Executive Officer*
 Charles Robert Lee Halley, A.B., M.D., *Clinical Professor of Medicine*
 Clayton Bernard Eldridge, M.D., *Clinical Professor of Medicine*
 Louis Katz Alpert, B.S., M.D., *Clinical Professor of Medicine*
 Sol Katz, B.S., M.D., *Adjunct Clinical Professor of Medicine*
 Joseph Francis Fazekas, B.S., M.D., *Adjunct Clinical Professor of Medicine*
 Harry Eagle, A.B., M.D., *Professional Lecturer in Medicine*
 Robert William Bullner, B.S., M.D., *Professional Lecturer in Medicine*
 Henry Field, Jr., M.D., *Professional Lecturer in Medicine*
 John Coleman Nussmecker, M.S., M.D., *Professional Lecturer in Medicine*
 Monroe James Romansky, A.B., M.D., *Associate Professor of Medicine*
 Peter Demetrius Comanduras, B.S., M.D., M.S. in Med., *Associate Clinical Professor of Medicine*
 John McCallum Evans, A.B., M.D., *Associate Clinical Professor of Medicine*
 Clarence Richard Hartman, A.B., M.D., *Associate Clinical Professor of Medicine*
 Walter Kennell Myers, B.S., M.D., *Assistant Clinical Professor of Medicine*
 John Alton Reed, A.B., M.D., *Assistant Clinical Professor of Medicine*
 Theodore Jason Abernethy, B.S., M.D., *Assistant Clinical Professor of Medicine*
 William Travis Gild, Jr., A.B., M.D., *Assistant Clinical Professor of Medicine*
 Roy Hertz, Ph.D., M.D., *Assistant Clinical Professor of Medicine*
 Alfred Henry Lawton, M.H., Ph.D., *Assistant Clinical Professor of Medicine*
 Samuel Ross Torgatt, M.D., *Assistant Clinical Professor of Medicine*
 Benjamin MacMaster, M.D., *Assistant Clinical Professor of Medicine*
 Pearl Holly, M.S., M.D., *Assistant Clinical Professor of Medicine*
 James Joseph Feller, A.B., M.D., *Assistant Clinical Professor of Medicine*
 John Watkins Trems, A.B., M.D., *Assistant Clinical Professor of Medicine*

- Albert David Kistin, A.M., M.D., *Assistant Clinical Professor of Medicine*
- Andrew Gabriel Prandoni, B.S., M.D., *Assistant Clinical Professor of Medicine*
- Ruth Heller Wichelhausen, M.D., *Assistant Clinical Professor of Medicine*
- Ludwig George Leshner, M.D., Ph.D., *Assistant Clinical Professor (Research) of Medicine*
- John Elford Smith, A.B., M.D., *Assistant Clinical Professor (Research) of Medicine*
- Lawrence Ellis Paton, A.B., M.D., *Assistant Clinical Professor of Medicine*
- Maurice Pictus, A.B., M.D., *Associate in Medicine*
- John Minor, A.B., M.D., *Associate in Medicine*
- Lawrence Jay Thomas, B.S., M.D., *Associate in Medicine*
- Bernard Luitman Hurdle, Jr., A.B., M.D., *Associate in Medicine*
- Charles William Ordman, A.B., M.D., *Associate in Medicine*
- Bonjamin Callaway Jones, Jr., A.B., M.D., *Associate in Medicine*
- Richard Bernard Caswell, A.B., M.D., *Associate in Medicine*
- Myer Harold Seiler, B.S., M.D., *Associate in Medicine*
- Sam Thompson Gibson, B.S., M.D., *Associate in Medicine*
- Walter Louis Nalla, B.S., M.D., *Associate in Medicine*
- Alfred Bragdon, M.D., *Associate in Medicine*
- Halla Brown, M.D., *Associate in Medicine*
- Rich Breunig Miller, A.B., M.D., *Associate in Medicine*
- Thomas Stone Samperton, A.B., M.D., *Associate in Medicine*
- John Christian Rapinowicz, A.B., M.D., *Associate in Medicine*
- Monte Arnold Gross, A.B., M.D., *Associate in Medicine*
- Samuel Jacob Nathan Stuart, Ph.D., M.D., *Associate in Medicine*
- Joseph Ney, B.S., M.D., *Associate in Medicine*
- Joseph Belmont, A.B., M.D., *Associate in Medicine*
- Frank Solomon Baron, B.S., M.D., *Associate in Medicine*
- Harry Daniel Eker, B.S., M.D., *Associate in Medicine*
- Jack Jacob Pomeroy, A.B., M.D., *Associate in Medicine*
- Ernest Gustaf Tammela, M.D., *Associate in Medicine*
- Theodore Harrison Hill, M.D., *Associate in Medicine*
- Julia Rayne Murphy, M.D., *Associate in Medicine*
- Louisa Ross, M.D., *Associate in Medicine*
- Frederic Dasher Channing, A.B., M.D., C.M., *Associate in Medicine*
- John Wilbur Lathrop, Jr., M.D., *Associate in Medicine*
- Lucius Homer Snyder, A.B., M.D., *Associate in Medicine*
- Charles William Jones, A.B., M.D., *Associate in Medicine*
- Thomas Joseph Pelen, B.S., M.D., *Associate in Medicine*
- Robert George Taylor, M.D., *Associate in Medicine*
- Charles Waters Thompson, M.D., *Associate in Medicine*

- James Walling Long, M.D., *Associate in Medicine*
 Eugene Solomon Gadsden, B.S., M.D., *Associate in Medicine*
 Maurice Mensch, M.D., *Associate in Medicine*
 Arthur Rosenbaum, B.S., M.D., *Associate in Medicine*
 Jarvis Edwin Seegmiller, A.B., M.D., *Associate in Medicine*
 Irvin Keffian, B.S., M.D., C.P.H., *Associate in Medicine*
 Virginia Patterson Beclar, A.B., M.D., *Associate in Medicine*
 Lester Sylvan Blumenthal, A.B., M.D., M.S. in Med., *Associate in Medicine*
 Stanley William Kirstein, B.S., M.D., *Associate in Medicine*
 James Francis Ambury, B.S., M.D., *Associate in Medicine*
 Robert Norwood Coale, B.S., M.D., *Associate in Medicine*
 Israel Kessler, M.S., M.D., *Associate in Medicine*
 Francis James Murray, B.S., M.D., *Associate in Medicine*
 Edwin Pearson Parker III, B.S., M.D., *Associate in Medicine*
 Morris Hirsh Rosenberg, A.B., M.D., *Associate in Medicine*
 John William Du Choe, M.D., *Associate in Medicine*
 Warren Daniel Brill, B.S., M.D., *Associate in Medicine*
 Marvin Fuchs, B.S., M.D., *Associate in Medicine*
 William Jack Weaver, Jr., A.B., M.D., *Associate in Medicine*
 Ruth Deshwaiz Boudlet, A.B., M.D., *Associate in Medicine*
 Thomas James Kennedy, Jr., B.S., M.D., *Associate (Research) in Medicine*
 Adrian Michael Hugben, M.D., Ph.D., *Associate (Research) in Medicine*
 Jack Orloff, M.D., *Associate (Research) in Medicine*
 Ernest Cotlove, B.S., M.D., *Associate (Research) in Medicine*
 James Irving Boyd, M.D., M.S., *Lecturer in Medicine*
 James Theodore Burns, M.D., *Clinical Instructor in Medicine*
 Charles Edward Law, M.D., *Clinical Instructor in Medicine*
 Emil Herbert Bakersfeld, A.B., M.D., *Clinical Instructor in Medicine*
 William Otis Bailey, Jr., M.D., *Clinical Instructor in Medicine*
 Harry Clark Bates, B.S., M.D., *Clinical Instructor in Medicine*
 Jeanne Cecile Bateman, A.B., M.D., *Clinical Instructor in Medicine*
 Thomas Lees Hartman, A.M., M.D., *Clinical Instructor in Medicine*
 Boris Rabkin, A.B., M.D., *Clinical Instructor in Medicine*
 Morton Harold Rose, M.D., *Clinical Instructor in Medicine*
 George Sharpe, A.B., M.D., *Clinical Instructor in Medicine*
 Cyril Augustus Schulman, B.S., M.D., *Clinical Instructor in Medicine*
 Louis Aleck Craig, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 Abraham Wolfe Danish, A.B., M.D., *Clinical Instructor in Medicine*
 Milton Gussack, A.B., M.D., *Clinical Instructor in Medicine*
 William Lewis, M.D., *Clinical Instructor in Medicine*
 Alvin Schizer, B.S., M.D., *Clinical Instructor in Medicine*
 Adolph Friedman, A.B., M.D., *Clinical Instructor in Medicine*
 Samuel Dennis Loube, A.B., M.D., *Clinical Instructor in Medicine*

- Alvin Edward Parrish, M.D., *Clinical Instructor in Medicine*
 Nahum Raphael Shulman, M.D., *Clinical Instructor in Medicine*
 Stewart William Bush, B.S., M.D., *Clinical Instructor in Medicine*
 Alfred Baer, A.B., M.D., *Clinical Instructor in Medicine*
 Jack Kleh, A.B., M.D., *Clinical Instructor in Medicine*
 James William Hollingsworth, M.D., *Clinical Instructor in Medicine*
 Edward Luke Rea, A.B., M.D., *Clinical Instructor in Medicine*
 William Robert Felts, Jr., B.S., M.D., *Clinical Instructor in Medicine*
 James Packard Mann, M.D., *Clinical Instructor in Medicine*
 Maurice Arthur Sislen, A.B., M.D., *Clinical Instructor in Medicine*
 William Holmes Crosby, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 Joseph Hicks Watson, B.S., M.D., *Clinical Instructor in Medicine*
 Conrad Gossels, M.D., *Clinical Instructor in Medicine*
 Charles Joseph Savarese, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 James Eliot Chapman, M.D., *Clinical Instructor in Medicine*
 Bernard Robert Cooperman, A.B., M.D., *Clinical Instructor in Medicine*
 Marshall Hannis Jacobson, A.B., M.D., *Clinical Instructor in Medicine*
 Gottfried Karl Duschak, M.D., *Clinical Instructor in Medicine*
 Norman Hartley Rubenstein, M.D., *Clinical Instructor in Medicine*
 Franklin Giesford Pfaugh, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 Leonard Laster, A.B., M.D., *Clinical Instructor in Medicine*
 Howard Otis Mott, A.B., M.D., *Clinical Instructor in Medicine*
 Max Gimble Sherer, M.S., M.D., *Clinical Instructor in Medicine*
 Jesse Leonard Steinfeld, B.S., M.D., *Clinical Instructor in Medicine*
 Donald Morgan Watkin, A.B., M.D., *Clinical Instructor in Medicine*
 James Barnes Wingarden, M.D., *Clinical Instructor in Medicine*
 David Duvall Thompson, A.B., M.D., *Clinical Instructor in Medicine*
 Paul Alan Marks, A.B., M.D., *Clinical Instructor in Medicine*
 Edward Adelson, B.S., M.D., *Clinical Instructor in Medicine*
 Kurt Julius Isselbacher, M.D., *Clinical Instructor in Medicine*
 Stanton Segal, M.D., *Clinical Instructor in Medicine*

132 *History of Medicine*
 One hour a week

The Staff

236 *Clinical Microscopy*

The Staff

Common and useful in the clinical laboratory of laboratory
 specimens of blood, urine, sputa, excreta, and secretions. Three
 hours a week.

241 *Physical Diagnosis I*

The Staff

Physical examination of the general physical system. One
 hour a week.

- 242 *Physical Diagnosis II* The Staff
Covers not only theoretical but practical application of principles of physical diagnosis as related to examination of patients. Six hours a week.
- 244 *Introduction to Medicine* The Staff
Lectures covering the principles of internal medicine, physiology, clinical anatomy and training in the hospital and outpatient practice. Four hours a week.
- 320 *Medical Jurisprudence* The Staff
Lectures on the legal and ethical rights of physicians, and on the legal problems with which the physician comes in contact. One hour a week for sixteen weeks.
- 325-26 *Clinical Clerkships* The Staff
Training with individual patients under individual instruction designed to develop ability in examination of patients and case taking as well as practice in clinical reasoning. Eight weeks. D. C. General Hospital.
- 327-28 *Clinical Pathological Conferences I* The Staff
Conferences are held at the School of Medicine. Case histories are presented and discussed by the students and members of the staff. Course literature, and autopsy findings are compared. One hour a week.
- 339-40 *Therapeutic Conferences I* Staff of Medicine and Pharmacology
Conferences designed to emphasize the application of principles of therapeutics to the problems of clinical medicine. Two hours a week. University and D. C. General Hospitals.
- 349-50 *Medical Conferences* The Staff
Two hours a week.
- 421-22 *Outpatient Clinics* The Staff
Individual case studies cover physical symptoms of the Staff. Discussion on current medical problems and associated clinical physical and aspects of disease. Individual conferences and instruction in clinical reasoning. Six weeks. University Hospital.
- 423-24 *Clinical Clerkship* The Staff
Six weeks. University and Mt. Airy Hospitals.
- 427-28 *Clinical Pathological Conferences II* The Staff
Continuation of Medicine 427-28. One hour a week.
- 429-30 *Clinical Pathological Conferences III* Postgraduate
Conferences are held at the University Hospital. Attendance is possible in alternate during their medical clerkship there. One hour a week.
- 431 *Forensic Medicine* The Staff
Organized in conjunction with the University Law School for the purpose of acquainting medical students with their legal duties. Three hours a week for four weeks.

NEUROLOGY AND NEUROLOGICAL SURGERY

James Winston Watts, B.S., M.D., *Professor of Neurological Surgery*
Executive Officer

Harold Stevens, Ph.D., M.D., *Professor of Neurology*

Hyman David Shapiro, M.D., *Associate Clinical Professor of Neurology*

Robert Henry Grob, B.S., M.D., *Associate Clinical Professor of Neurology*

Jonathan Marshall Williams, M.D., *Assistant Clinical Professor of Neurological Surgery*

James Peter Murphy, B.S., M.D., *Assistant Clinical Professor of Neurological Surgery*

Hugo Victor Rizzoli, A.B., M.D., *Assistant Clinical Professor of Neurological Surgery*

Paul Chodoff, A.B., M.D., *Associate in Neurology*

George Davis Weckhardt, M.D., *Associate in Neurology*

John Martin, M.D., Ph.D., *Associate in Neurological Surgery*

Harvey Ammerman, B.S., M.D., *Clinical Instructor in Neurological Surgery*

James Francis Hammill, B.S., M.D., *Clinical Instructor in Neurology*

Geoffrey Swan, M.D., *Clinical Instructor in Neurological Surgery*

Marvin Curtis Korfholz, D.D.S., B.S., M.B., M.D., *Clinical Instructor in Neurology*

John Thomas Lord, A.B., M.D., C.M., *Clinical Instructor in Neurological Surgery*

Delora Fowler Mott, M.D., *Clinical Instructor in Neurology*

249 *Neurology (Lectures)* Stevens, Williams
 Material used by study of the form and function of the nervous system; lesions and planning neurological. One hour a week.

250 *Neurology* Shapiro, Stevens
 Lectures on system in clinical neurology with specimens, lesions and planning. One hour a week.

331 *Neurology and Neurological Surgery* Watts, Stevens
 Clinical history and demonstrations. One hour a week.

333-334 *Neurology and Neurological Surgery* Stevens, Williams
Clinical Clerkship Ammerman
 Instruction in history, physical examination, radiology, clinical neurology. Attendance at neurological operations. Six students in rotation two weeks. D. C. General Hospital.

* On sabbatical leave.

- 335-36 *Neurological Conference* Stevens and Staff
 Clinical conference one afternoon a week followed by one pathologic study of specimens from autopsy necropsies. Two and one-half hours a week. Six students in rotation, two weeks. D. C. General Hospital.
- 411-12 *Neurology and Neurological Surgery* Shapiro, Rizzell
Clinic
 Neurological outpatient clinic. Consultation of staff on ambulatory cases, demonstration of diagnostic procedures, discussion of neurophysiologic cases, and records. Six students in rotation. Two hours a week. University Hospital.
- 433-34 *Clinical Neurology* Givoli
 Neurological lectures, examinations and demonstrations. Six students in rotation. Two hours a week. St. Elizabeths Hospital.
- 436 *Neurological Surgery (elective)* Murphy and Staff
 Lectures and routine patient demonstration of neurosurgical procedures. One hour a week.

OBSTETRICS AND GYNECOLOGY

- John Parks, M.S., M.D., *Professor of Obstetrics and Gynecology,
Executive Officer*
- Henry Laurant Darnier, A.B., M.D., *Clinical Professor of Obstetrics
and Gynecology*
- George Nordlinger, A.B., M.D., *Clinical Professor of Obstetrics and
Gynecology*
- Robert Henry Barter, B.S., M.D., *Associate Professor of Obstetrics and
Gynecology*
- Samuel Mayer Dodek, A.M., M.D., *Associate Clinical Professor of
Obstetrics and Gynecology*
- Jeremiah Keith Cromer, M.D., *Assistant Clinical Professor of Ob-
stetrics and Gynecology*
- James Albert Dushabek, M.D., *Associate in Obstetrics and Gynecology*
- Clarence Kendall Fraser, Ph.B., M.D., *Associate in Obstetrics and
Gynecology*
- Barton Winters Richwine, M.D., *Associate in Obstetrics and Gynec-
ology*
- Floyd Sterling Rogers, M.D., *Associate in Obstetrics and Gynecology*
- Rufus Martin Roll, A.B., M.D., *Associate in Obstetrics and Gynec-
ology*
- Caroline Jackson, A.M., M.D., *Associate in Obstetrics and Gynecology*
- Julius Robert Epstein, M.D., *Clinical Instructor in Obstetrics and
Gynecology*
- Morton Selwyn Kaufman, A.B., M.D., *Clinical Instructor in Obstetrics
and Gynecology*
- William Thurston Lady, M.D., *Clinical Instructor in Obstetrics and
Gynecology*
- Jed Williams Pearson, Jr., A.B., M.D., *Clinical Instructor in Obstetrics
and Gynecology*
- Samuel Hazen Shea, M.D., *Clinical Instructor in Obstetrics and Gynec-
ology*
- Thomas Miles Leonard, Ph.B., M.D., *Clinical Instructor in Obstetrics
and Gynecology*
- Albert Seymour Bright, M.D., *Clinical Instructor in Obstetrics and
Gynecology*
- Shirley Sue Martin, M.D., *Clinical Instructor in Obstetrics and Gynec-
ology*
- Neel Jack Price, B.S., M.D., *Clinical Instructor in Obstetrics and Gynec-
ology*
- Roland Essig Bieren, M.D., *Clinical Instructor in Obstetrics and Gynec-
ology*

- Alexander LeSueur Russell, M.D., *Clinical Instructor in Obstetrics and Gynecology*
 Thomas Ashton Wilson, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
 Marvin Peace Footer, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
 Donald Walters, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*
 Joseph Marshall Friedman, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
 Leon McNeeh Loverett, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*
 William Premiss McKelway, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
 William Herbert Cooper, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*

254 *Introduction to Obstetrics and Gynecology*

Dinkel, Frank

Lectures and demonstrations on the physiology and management of normal pregnancy. One hour a week.

331-2 *Manual Demonstrations*

Lucas

The mechanism of labor and various types of operative delivery illustrated by means of the human skull in model form. H. C. Gould, Instructor.

337-32 *Obstetrics and Gynecology*

The Staff

Lectures and demonstrations on the anatomy and physiology of pregnancy. Two hours a week.

351-52 *Clinical Clerkship*

The Staff

Clerking with patients, including ward rounds, examining room, operating room, and delivery room. Four weeks. H. C. Gould, Instructor.

441-42 *Clinical Obstetrics*

Park, Burr

Students participate in general and internal clinic work, delivery room, and delivery patients under supervision of the staff and H. C. Gould, Instructor.

443-44 *Clinical Gynecology*

Park, Burr

Students observe and participate in the general and internal clinic work of the University and H. C. Gould, Instructor.

OPHTHALMOLOGY

- Ronald Amore Cox, A.B., M.D., *Professor of Ophthalmology, Executive Officer*
 Ernest Alfred Watson Sheppard, M.D., C.M., *Clinical Professor of Ophthalmology*
 Richard Wallace Wilkinson, A.B., M.D., M.S. in Med., *Assistant Clinical Professor of Ophthalmology*
 Cannon Robert Naples, B.S., M.D., *Associate in Ophthalmology*
 Walter Joseph Romejko, M.D., *Associate in Ophthalmology*
 William Paxson Chaffetz, Jr., M.D., *Associate in Ophthalmology*
 William Joseph Graham Davis, A.B., M.D., *Associate in Ophthalmology*
 Robert Edward duPree, B.S., M.D., *Associate in Ophthalmology*
 Robert Day, A.B., M.D., *Associate in Ophthalmology*
 Ralph John Carbo, Jr., A.B., M.D., *Clinical Instructor in Ophthalmology*
 Melvin Gustavus Alper, A.B., M.D., *Clinical Instructor in Ophthalmology*
 Oscar Levine, M.D., *Clinical Instructor in Ophthalmology*

351-52 *Ophthalmology*

The Staff

A course which presents the principles of ophthalmology, with special reference to those of importance to the general practitioner. One hour a week for sixteen weeks.

447 *Eye*

The Staff

During routine instruction given, each student is given individual instruction by the ophthalmologic expert of system of vision. An-
 versary Hospital.

OTOLARYNGOLOGY

- William Herndon Jenkins, M.D., *Clinical Professor of Otolaryngology*
 Aubrey David Fischer, M.D., *Assistant Clinical Professor of Otolaryngology*
 James Jerry M. Farland, Jr., B.S., M.D., *Assistant Clinical Professor of Otolaryngology, Executive Officer*
 Catharine Birch, A.B., M.D., *Associate in Otolaryngology*
 Jack Louis Levine, M.D., *Associate in Otolaryngology*
 Aram Glorig, Jr., B.S., M.D., *Clinical Instructor in Otolaryngology*
 Morris Edward Kincott, B.S., M.D., *Clinical Instructor in Otolaryngology*
 Russel Smith Page, Jr., A.B., M.D., *Clinical Instructor in Otolaryngology*
 Willard Beecher Walters, B.S., M.D., *Clinical Instructor in Otolaryngology*
 Albert Sidney Winer, A.B., M.D., *Clinical Instructor in Otolaryngology*
 Harry Ward McCurdy, A.B., M.D., *Clinical Instructor in Otolaryngology*
 Joseph Aziz Sabri, A.B., M.D., *Clinical Instructor in Otolaryngology*

- 351 *Otolaryngology* M. Farland, Jenkins
 Lectures and demonstrations on anatomy, physiology, and diseases of the ear, nose, and throat. One hour a week.
- 354 *Bronchoscopy* McFarland
 A series of lectures on the fundamental principles and the use of instruments, including both the bronchoscope and esophagoscope. One hour a week for two weeks.
- 355 *Clinic* The Staff
 Practical clinical instruction in the diagnosis and treatment of diseases of the ear, nose, and throat. One and one-half hours once a week. (D. C. General Hospital)

PATHOLOGY

Roger Morrison Choisser, B.S., M.D., *Professor of Pathology*
 Thomas Martin Peery, A.B., M.D., *Professor of Pathology, Executive Officer*
 Daniel Leigh Weiss, A.B., M.D., *Adjunct Clinical Professor of Pathology*
 Frank Nelson Miller, B.S., M.D., *Associate Professor of Pathology*
 William Newman, A.B., M.D., *Assistant Professor of Pathology*
 Lorenz Eugene Zimmerman, A.B., M.D., *Associate in Pathology*

SPECIAL STAFF FOR DEMONSTRATIONS

John Stewart Howe, A.B., M.D., *Assistant Clinical Professor of Pathology*
 Raymond Georges Gottschalk, B.S., M.D., *Associate in Pathology*
 Franklin Martin, Jr., M.D.C.M., M.S. in Neurology, *Associate in Pathology*
 Richard Emery Palmer, A.B., M.D., *Associate in Pathology*
 William Francis Enos, A.B., M.D., *Clinical Instructor in Pathology*
 Robert Joel Fink, M.D., *Clinical Instructor in Pathology*
 Lester Walter Fix, M.D., *Clinical Instructor in Pathology*

SPECIAL LECTURERS

Elson Bowman Helwig, B.S., M.D., *Assistant Chief, Pathology Division, Armed Forces Institute of Pathology*
 Hans Frank Smetana, M.D., *Pathologist, Armed Forces Institute of Pathology*
 Elizabeth Mapelsden Ramsey, A.B., M.D., *Research Associate and Pathologist, Department of Embryology, Carnegie Institution of Washington*
 Lene Clifton Johnson, B.S., M.D., *Pathologist, Armed Forces Institute of Pathology*

251-62 *Pathology*

General pathology of inflammation, degenerative, neoplastic, and infectious diseases. Special pathology of the organs and systems of the body. The laboratory work consists of the gross and microscopic study of material from the various systems. Special attention is given to the gross pathology of the various systems of the body and their correlation with systematic and clinical studies. Fall term, eight hours a week; spring term, two hours a week.

Peery, Miller

261-62 *Necropsy*

Students are required to attend and assist in the performance of necropsies at the University Hospital.

The Staff

- 263-64 *Demonstrations in Pathology* The Staff
Common specimens of representative cases are demonstrated and discussed. One hour a week.
- 265-66 *Correlation of Pathology with Clinical Diagnosis* The Staff
Lectures and case demonstrations are given by members of the medical, surgical, and radiological staffs. One hour a week.
- 267-68 *Seminars in Pathology (selective)* The Staff
Advanced students are presented in special topics in pathology. One hour a week.
- 322 *Medical Jurisprudence* Miller
Forensic pathology and toxicology. The legal and ethical rights and responsibilities of physicians. Local problems in medicine. One hour a week.
- 327-28 *Clinical Pathological Conference I* The Staff
Conferences are held at the School of Medicine. Case histories are presented and discussed by the students and members of the staff. Clinical, laboratory, and roentgeny findings are compared. One hour a week.
- 427-28 *Clinical Pathological Conference II* The Staff
Continuation of Pathology 327-28. One hour a week.
- 429-30 *Clinical Pathological Conference III* Perry, Holly
Conferences are held at the University Hospital. Attendance is required of students during their medical clerkship years. One hour a week.
- 471-72 *Surgical Pathology* Newman
Common and representative surgical specimens are demonstrated and discussed. One hour a week.
- 473-74 *Pathology Clerkship* Perry, Miller, Newman
A limited number of students receive training in medical pathology and participate in the laboratory of the University Hospital.

PEDIATRICS

- Preston Alexander McLendon, B.S., M.D., *Professor of Pediatrics, Executive Officer*
- Margaret Mary Nicholson, A.B., M.D., *Clinical Professor of Pediatrics*
- Edward Lewis, M.D., *Clinical Professor of Pediatrics*
- William Statton Anderson, A.B., M.D., *Clinical Professor of Pediatrics*
- Leroy Edward Hock, M.D., *Adjunct Clinical Professor of Pediatrics*
- John Augustine Washington, B.S., M.D., *Associate Clinical Professor of Pediatrics*
- Reginald Spencer Lourie, B.S., M.D., Med. S.D., *Associate Clinical Professor of Pediatric Psychiatry*
- Joseph Michael LePrieux, B.S., M.D., *Assistant Professor of Pediatrics*
- Malcol Harlickenden Grosvenor, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- Arthur Nimetz, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- Dorothy Steele Jaeger-Lee, M.D., *Assistant Clinical Professor of Pediatrics*
- George Makem, M.D., M.S. in Ped., *Assistant Clinical Professor of Pediatrics*
- William Allen Howard, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- John Howell Peacock, B.S., M.D., *Associate in Pediatrics*
- Maynard Irving Cohen, A.B., M.D., *Associate in Pediatrics*
- Mary Katherine Laurence Sirtwell, A.B., M.D., *Associate in Pediatrics*
- Allen Bertram Cohen, M.D., *Associate in Pediatrics*
- Charles Fredrick Sengler, A.B., M.D., *Associate in Pediatrics*
- Hugh Cassel Clark, A.B., M.D., *Associate in Pediatrics*
- Alvin Reuss, Jr., B.S., M.D., *Associate in Pediatrics*
- Robert Edward Martin, M.D., *Associate in Pediatrics*
- Charles Richard Webb, B.S., M.D., *Associate in Pediatrics*
- William Stark, A.B., M.D., *Associate in Pediatric Psychiatry*
- Margaret Frances Castles, A.B., M.D., *Associate in Pediatrics*
- Herbert Harold Diamond, M.D., *Clinical Instructor in Pediatrics*
- Reginald Henry Mitchell, M.D., *Clinical Instructor in Pediatrics*
- Robert Orr Warren, M.D., *Clinical Instructor in Pediatrics*
- Lucile Annabelle Blak, B.S., M.D., *Clinical Instructor in Pediatrics*
- Robert Harper Anderson, M.D., *Clinical Instructor in Pediatrics*
- Warren Gustafson Pomeroy, A.B., M.D., *Clinical Instructor in Pediatrics*
- Marcel Schwartz Sawyer, A.B., M.D., *Clinical Instructor in Pediatrics*
- Samuel Leon Leikin, M.D., *Clinical Instructor in Pediatrics*
- Bernard Olshaker, A.B., M.D., *Clinical Instructor in Pediatric Psychiatry*
- Harold Taylor Yates, M.D., *Clinical Instructor in Pediatrics*

SPECIAL LECTURER

Myron Ezra Wegman, A.B., M.D., M.P.H., *Director, Division of Education and Training, Pan American Sanitary Bureau, Regional Office for the Americas of World Health Organization; Pediatrics*

256 *Pediatrics*

M Lendon and Staff

Lectures on physiology of the newborn, development, infant nutrition, diseases of the newborn, common infections and systemic diseases of infancy and childhood. Two hours a week. Medical School.

357-58 *Clinical Clerkship—General Pediatrics*

LoPresti and Staff

Introduction to general pediatrics. Emphasis on bedside diagnosis and management including the newborn. Ward rounds. Full schedule of rotations, two weeks. D. C. General Hospital.

359-60 *Clinical Clerkship—Contagious Diseases*

LoPresti and Staff

Confusion and isolation, treatment of contagious and infectious diseases. Prevention and prophylactic measures. Five students in rotation, two weeks. D. C. General Hospital.

361-62 *Clinical Conference I*

McLendon and Staff

Rotated. Presentation and discussion by students of current problems. One hour a week. D. C. General Hospital.

363-64 *Ward Rounds*

Nicholson, LoPresti, and Staff

Five weekly ward rounds with private and Resident staff. D. C. General Hospital.

365-66 *Psychiatry*

Laurie and Staff

Lectures on mental hygiene and emotional development. Case studies. Second, third, and fourth years.

457-58 *Clinical Clerkship*

Anderson and Staff

Full time, including emergency service and laboratory experience. Case studies on ward rounds direct Resident supervision. Ward rounds, first and second Rotations. Twelve students on rounds. Children's Hospital.

459-60 *Outpatient Clinics*

Gutelius and Staff

Work in Medical and Specialty Clinics, including medical, surgical, neurology, child welfare, infectious diseases, dermatology, ophthalmology and otolaryngology. Children's Hospital.

461-62 *Clinico-pathological Conferences*

The Staff

Clinical and pathological discussion of cases without history and without data. One a week. Children's Hospital.

463-64 *Section Conferences*

The Staff

Discussion of clinical problems of diagnosis and treatment in various sections. Two a week. Children's Hospital.

- 45-60 *Section Conferences* The Staff
Surgical diagnosis, pre- and post-operative management. One hour a week. Children's Hospital.
- 47-68 *Clinical Conference II* McLendon and Staff
Required. Case presentations by students. Staff and student discussion of diagnosis and management. One hour a week. Medical School.
- 49-70 *Child Guidance and Development* Jaeger-Lee, Louie
Lectures to second year class. Clerkship in fourth year including Well Baby Clinic. Group and class conferences.

PHARMACOLOGY

Paul Kenneth Smith, Ph.D., *Professor of Pharmacology, Executive Officer*

Ralph Gratton Smith, M.D., Ph.D., *Clinical Professor of Pharmacology*

Bernard Beryl Brodie, Ph.D., *Professorial Lecturer in Pharmacology*

Harold George Mandel, Ph.D., *Associate Professor of Pharmacology*

Gertrude Diane Maengwyn-Davies, Ph.D., *Associate Research Professor of Pharmacology*

Clarke Davison, Ph.D., *Assistant Professor of Pharmacology*

Glenn Albert Fischer, Ph.D., *Assistant Research Professor of Pharmacology*

Moseshyon Virthal Nadeau, Ph.D., *Assistant Research Professor of Pharmacology*

Joyce Barbara Brous, Ph.D., *Assistant Research Professor of Pharmacology*

Eberhard Georg Trams, Ph.D., *Assistant Research Professor of Pharmacology*

Master of Arts or Master of Science in the field of Pharmacology (College of Arts and Sciences)—Prerequisite: A Bachelor of Arts or Bachelor of Science degree. The undergraduate program must include the following courses in the following sequence: Zoology 1-2, Physics 5, 7, 8, Chemistry 11-13, 40, 131-33, Biology 11-12, 21-22 and Physiology 115, 117 are recommended as the minimum for the candidate wishing to complete the work for the Master's degree in one year.

Required: the general requirements as stated in page 34-35. The study hours of required work must include Biochemistry 231-233, Pharmacology 115, 117, Physiology 211, 212, 213-215, 217-219. The candidate must also be selected from Biochemistry 233, 235-237, 239, Physiology 150, Biochemistry 120, 230, 231, Pharmacology 115.

Master of Arts or Master of Science in the field of Chemotherapy (College of Arts and Sciences)—Prerequisite: A Bachelor of Arts or a Bachelor of Science degree. The undergraduate program must include the following courses in the following sequence: Zoology 1-2, 41-42, Physics 5, 7, Chemistry 11-13, 22, 131-33, Biology 11-12, 21-22, 41-42, 44-45, 47-49, 51-52, 54-55, 57-59, 61-62, 64-65, 67-69, 71-72, 74-75, 77-79, 81-82, 84-85, 87-89, 91-92, 94-95, 97-99, 101-102, 104-105, 107-109, 111-112, 114-115, 117-119, 121-122, 124-125, 127-129, 131-132, 134-135, 137-139, 141-142, 144-145, 147-149, 151-152, 154-155, 157-159, 161-162, 164-165, 167-169, 171-172, 174-175, 177-179, 181-182, 184-185, 187-189, 191-192, 194-195, 197-199, 201-202, 204-205, 207-209, 211-212, 214-215, 217-219, 221-222, 224-225, 227-229, 231-232, 234-235, 237-239, 241-242, 244-245, 247-249, 251-252, 254-255, 257-259, 261-262, 264-265, 267-269, 271-272, 274-275, 277-279, 281-282, 284-285, 287-289, 291-292, 294-295, 297-299, 301-302, 304-305, 307-309, 311-312, 314-315, 317-319, 321-322, 324-325, 327-329, 331-332, 334-335, 337-339, 341-342, 344-345, 347-349, 351-352, 354-355, 357-359, 361-362, 364-365, 367-369, 371-372, 374-375, 377-379, 381-382, 384-385, 387-389, 391-392, 394-395, 397-399, 401-402, 404-405, 407-409, 411-412, 414-415, 417-419, 421-422, 424-425, 427-429, 431-432, 434-435, 437-439, 441-442, 444-445, 447-449, 451-452, 454-455, 457-459, 461-462, 464-465, 467-469, 471-472, 474-475, 477-479, 481-482, 484-485, 487-489, 491-492, 494-495, 497-499, 501-502, 504-505, 507-509, 511-512, 514-515, 517-519, 521-522, 524-525, 527-529, 531-532, 534-535, 537-539, 541-542, 544-545, 547-549, 551-552, 554-555, 557-559, 561-562, 564-565, 567-569, 571-572, 574-575, 577-579, 581-582, 584-585, 587-589, 591-592, 594-595, 597-599, 601-602, 604-605, 607-609, 611-612, 614-615, 617-619, 621-622, 624-625, 627-629, 631-632, 634-635, 637-639, 641-642, 644-645, 647-649, 651-652, 654-655, 657-659, 661-662, 664-665, 667-669, 671-672, 674-675, 677-679, 681-682, 684-685, 687-689, 691-692, 694-695, 697-699, 701-702, 704-705, 707-709, 711-712, 714-715, 717-719, 721-722, 724-725, 727-729, 731-732, 734-735, 737-739, 741-742, 744-745, 747-749, 751-752, 754-755, 757-759, 761-762, 764-765, 767-769, 771-772, 774-775, 777-779, 781-782, 784-785, 787-789, 791-792, 794-795, 797-799, 801-802, 804-805, 807-809, 811-812, 814-815, 817-819, 821-822, 824-825, 827-829, 831-832, 834-835, 837-839, 841-842, 844-845, 847-849, 851-852, 854-855, 857-859, 861-862, 864-865, 867-869, 871-872, 874-875, 877-879, 881-882, 884-885, 887-889, 891-892, 894-895, 897-899, 901-902, 904-905, 907-909, 911-912, 914-915, 917-919, 921-922, 924-925, 927-929, 931-932, 934-935, 937-939, 941-942, 944-945, 947-949, 951-952, 954-955, 957-959, 961-962, 964-965, 967-969, 971-972, 974-975, 977-979, 981-982, 984-985, 987-989, 991-992, 994-995, 997-999, 1001-1002, 1004-1005, 1007-1009, 1011-1012, 1014-1015, 1017-1019, 1021-1022, 1024-1025, 1027-1029, 1031-1032, 1034-1035, 1037-1039, 1041-1042, 1044-1045, 1047-1049, 1051-1052, 1054-1055, 1057-1059, 1061-1062, 1064-1065, 1067-1069, 1071-1072, 1074-1075, 1077-1079, 1081-1082, 1084-1085, 1087-1089, 1091-1092, 1094-1095, 1097-1099, 1101-1102, 1104-1105, 1107-1109, 1111-1112, 1114-1115, 1117-1119, 1121-1122, 1124-1125, 1127-1129, 1131-1132, 1134-1135, 1137-1139, 1141-1142, 1144-1145, 1147-1149, 1151-1152, 1154-1155, 1157-1159, 1161-1162, 1164-1165, 1167-1169, 1171-1172, 1174-1175, 1177-1179, 1181-1182, 1184-1185, 1187-1189, 1191-1192, 1194-1195, 1197-1199, 1201-1202, 1204-1205, 1207-1209, 1211-1212, 1214-1215, 1217-1219, 1221-1222, 1224-1225, 1227-1229, 1231-1232, 1234-1235, 1237-1239, 1241-1242, 1244-1245, 1247-1249, 1251-1252, 1254-1255, 1257-1259, 1261-1262, 1264-1265, 1267-1269, 1271-1272, 1274-1275, 1277-1279, 1281-1282, 1284-1285, 1287-1289, 1291-1292, 1294-1295, 1297-1299, 1301-1302, 1304-1305, 1307-1309, 1311-1312, 1314-1315, 1317-1319, 1321-1322, 1324-1325, 1327-1329, 1331-1332, 1334-1335, 1337-1339, 1341-1342, 1344-1345, 1347-1349, 1351-1352, 1354-1355, 1357-1359, 1361-1362, 1364-1365, 1367-1369, 1371-1372, 1374-1375, 1377-1379, 1381-1382, 1384-1385, 1387-1389, 1391-1392, 1394-1395, 1397-1399, 1401-1402, 1404-1405, 1407-1409, 1411-1412, 1414-1415, 1417-1419, 1421-1422, 1424-1425, 1427-1429, 1431-1432, 1434-1435, 1437-1439, 1441-1442, 1444-1445, 1447-1449, 1451-1452, 1454-1455, 1457-1459, 1461-1462, 1464-1465, 1467-1469, 1471-1472, 1474-1475, 1477-1479, 1481-1482, 1484-1485, 1487-1489, 1491-1492, 1494-1495, 1497-1499, 1501-1502, 1504-1505, 1507-1509, 1511-1512, 1514-1515, 1517-1519, 1521-1522, 1524-1525, 1527-1529, 1531-1532, 1534-1535, 1537-1539, 1541-1542, 1544-1545, 1547-1549, 1551-1552, 1554-1555, 1557-1559, 1561-1562, 1564-1565, 1567-1569, 1571-1572, 1574-1575, 1577-1579, 1581-1582, 1584-1585, 1587-1589, 1591-1592, 1594-1595, 1597-1599, 1601-1602, 1604-1605, 1607-1609, 1611-1612, 1614-1615, 1617-1619, 1621-1622, 1624-1625, 1627-1629, 1631-1632, 1634-1635, 1637-1639, 1641-1642, 1644-1645, 1647-1649, 1651-1652, 1654-1655, 1657-1659, 1661-1662, 1664-1665, 1667-1669, 1671-1672, 1674-1675, 1677-1679, 1681-1682, 1684-1685, 1687-1689, 1691-1692, 1694-1695, 1697-1699, 1701-1702, 1704-1705, 1707-1709, 1711-1712, 1714-1715, 1717-1719, 1721-1722, 1724-1725, 1727-1729, 1731-1732, 1734-1735, 1737-1739, 1741-1742, 1744-1745, 1747-1749, 1751-1752, 1754-1755, 1757-1759, 1761-1762, 1764-1765, 1767-1769, 1771-1772, 1774-1775, 1777-1779, 1781-1782, 1784-1785, 1787-1789, 1791-1792, 1794-1795, 1797-1799, 1801-1802, 1804-1805, 1807-1809, 1811-1812, 1814-1815, 1817-1819, 1821-1822, 1824-1825, 1827-1829, 1831-1832, 1834-1835, 1837-1839, 1841-1842, 1844-1845, 1847-1849, 1851-1852, 1854-1855, 1857-1859, 1861-1862, 1864-1865, 1867-1869, 1871-1872, 1874-1875, 1877-1879, 1881-1882, 1884-1885, 1887-1889, 1891-1892, 1894-1895, 1897-1899, 1901-1902, 1904-1905, 1907-1909, 1911-1912, 1914-1915, 1917-1919, 1921-1922, 1924-1925, 1927-1929, 1931-1932, 1934-1935, 1937-1939, 1941-1942, 1944-1945, 1947-1949, 1951-1952, 1954-1955, 1957-1959, 1961-1962, 1964-1965, 1967-1969, 1971-1972, 1974-1975, 1977-1979, 1981-1982, 1984-1985, 1987-1989, 1991-1992, 1994-1995, 1997-1999, 2001-2002, 2004-2005, 2007-2009, 2011-2012, 2014-2015, 2017-2019, 2021-2022, 2024-2025, 2027-2029, 2031-2032, 2034-2035, 2037-2039, 2041-2042, 2044-2045, 2047-2049, 2051-2052, 2054-2055, 2057-2059, 2061-2062, 2064-2065, 2067-2069, 2071-2072, 2074-2075, 2077-2079, 2081-2082, 2084-2085, 2087-2089, 2091-2092, 2094-2095, 2097-2099, 2101-2102, 2104-2105, 2107-2109, 2111-2112, 2114-2115, 2117-2119, 2121-2122, 2124-2125, 2127-2129, 2131-2132, 2134-2135, 2137-2139, 2141-2142, 2144-2145, 2147-2149, 2151-2152, 2154-2155, 2157-2159, 2161-2162, 2164-2165, 2167-2169, 2171-2172, 2174-2175, 2177-2179, 2181-2182, 2184-2185, 2187-2189, 2191-2192, 2194-2195, 2197-2199, 2201-2202, 2204-2205, 2207-2209, 2211-2212, 2214-2215, 2217-2219, 2221-2222, 2224-2225, 2227-2229, 2231-2232, 2234-2235, 2237-2239, 2241-2242, 2244-2245, 2247-2249, 2251-2252, 2254-2255, 2257-2259, 2261-2262, 2264-2265, 2267-2269, 2271-2272, 2274-2275, 2277-2279, 2281-2282, 2284-2285, 2287-2289, 2291-2292, 2294-2295, 2297-2299, 2301-2302, 2304-2305, 2307-2309, 2311-2312, 2314-2315, 2317-2319, 2321-2322, 2324-2325, 2327-2329, 2331-2332, 2334-2335, 2337-2339, 2341-2342, 2344-2345, 2347-2349, 2351-2352, 2354-2355, 2357-2359, 2361-2362, 2364-2365, 2367-2369, 2371-2372, 2374-2375, 2377-2379, 2381-2382, 2384-2385, 2387-2389, 2391-2392, 2394-2395, 2397-2399, 2401-2402, 2404-2405, 2407-2409, 2411-2412, 2414-2415, 2417-2419, 2421-2422, 2424-2425, 2427-2429, 2431-2432, 2434-2435, 2437-2439, 2441-2442, 2444-2445, 2447-2449, 2451-2452, 2454-2455, 2457-2459, 2461-2462, 2464-2465, 2467-2469, 2471-2472, 2474-2475, 2477-2479, 2481-2482, 2484-2485, 2487-2489, 2491-2492, 2494-2495, 2497-2499, 2501-2502, 2504-2505, 2507-2509, 2511-2512, 2514-2515, 2517-2519, 2521-2522, 2524-2525, 2527-2529, 2531-2532, 2534-2535, 2537-2539, 2541-2542, 2544-2545, 2547-2549, 2551-2552, 2554-2555, 2557-2559, 2561-2562, 2564-2565, 2567-2569, 2571-2572, 2574-2575, 2577-2579, 2581-2582, 2584-2585, 2587-2589, 2591-2592, 2594-2595, 2597-2599, 2601-2602, 2604-2605, 2607-2609, 2611-2612, 2614-2615, 2617-2619, 2621-2622, 2624-2625, 2627-2629, 2631-2632, 2634-2635, 2637-2639, 2641-2642, 2644-2645, 2647-2649, 2651-2652, 2654-2655, 2657-2659, 2661-2662, 2664-2665, 2667-2669, 2671-2672, 2674-2675, 2677-2679, 2681-2682, 2684-2685, 2687-2689, 2691-2692, 2694-2695, 2697-2699, 2701-2702, 2704-2705, 2707-2709, 2711-2712, 2714-2715, 2717-2719, 2721-2722, 2724-2725, 2727-2729, 2731-2732, 2734-2735, 2737-2739, 2741-2742, 2744-2745, 2747-2749, 2751-2752, 2754-2755, 2757-2759, 2761-2762, 2764-2765, 2767-2769, 2771-2772, 2774-2775, 2777-2779, 2781-2782, 2784-2785, 2787-2789, 2791-2792, 2794-2795, 2797-2799, 2801-2802, 2804-2805, 2807-2809, 2811-2812, 2814-2815, 2817-2819, 2821-2822, 2824-2825, 2827-2829, 2831-2832, 2834-2835, 2837-2839, 2841-2842, 2844-2845, 2847-2849, 2851-2852, 2854-2855, 2857-2859, 2861-2862, 2864-2865, 2867-2869, 2871-2872, 2874-2875, 2877-2879, 2881-2882, 2884-2885, 2887-2889, 2891-2892, 2894-2895, 2897-2899, 2901-2902, 2904-2905, 2907-2909, 2911-2912, 2914-2915, 2917-2919, 2921-2922, 2924-2925, 2927-2929, 2931-2932, 2934-2935, 2937-2939, 2941-2942, 2944-2945, 2947-2949, 2951-2952, 2954-2955, 2957-2959, 2961-2962, 2964-2965, 2967-2969, 2971-2972, 2974-2975, 2977-2979, 2981-2982, 2984-2985, 2987-2989, 2991-2992, 2994-2995, 2997-2999, 3001-3002, 3004-3005, 3007-3009, 3011-3012, 3014-3015, 3017-3019, 3021-3022, 3024-3025, 3027-3029, 3031-3032, 3034-3035, 3037-3039, 3041-3042, 3044-3045, 3047-3049, 3051-3052, 3054-3055, 3057-3059, 3061-3062, 3064-3065, 3067-3069, 3071-3072, 3074-3075, 3077-3079, 3081-3082, 3084-3085, 3087-3089, 3091-3092, 3094-3095, 3097-3099, 3101-3102, 3104-3105, 3107-3109, 3111-3112, 3114-3115, 3117-3119, 3121-3122, 3124-3125, 3127-3129, 3131-3132, 3134-3135, 3137-3139, 3141-3142, 3144-3145, 3147-3149, 3151-3152, 3154-3155, 3157-3159, 3161-3162, 3164-3165, 3167-3169, 3171-3172, 3174-3175, 3177-3179, 3181-3182, 3184-3185, 3187-3189, 3191-3192, 3194-3195, 3197-3199, 3201-3202, 3204-3205, 3207-3209, 3211-3212, 3214-3215, 3217-3219, 3221-3222, 3224-3225, 3227-3229, 3231-3232, 3234-3235, 3237-3239, 3241-3242, 3244-3245, 3247-3249, 3251-3252, 3254-3255, 3257-3259, 3261-3262, 3264-3265, 3267-3269, 3271-3272, 3274-3275, 3277-3279, 3281-3282, 3284-3285, 3287-3289, 3291-3292, 3294-3295, 3297-3299, 3301-3302, 3304-3305, 3307-3309, 3311-3312, 3314-3315, 3317-3319, 3321-3322, 3324-3325, 3327-3329, 3331-3332, 3334-3335, 3337-3339, 3341-3342, 3344-3345, 3347-3349, 3351-3352, 3354-3355, 3357-3359, 3361-3362, 3364-3365, 3367-3369, 3371-3372, 3374-3375, 3377-3379, 3381-3382, 3384-3385, 3387-3389, 3391-3392, 3394-3395, 3397-3399, 3401-3402, 3404-3405, 3407-3409, 3411-3412, 3414-3415, 3417-3419, 3421-3422, 3424-3425, 3427-3429, 3431-3432, 3434-3435, 3437-3439, 3441-3442, 3444-3445, 3447-3449, 3451-3452, 3454-3455, 3457-3459, 3461-3462, 3464-3465, 3467-3469, 3471-3472, 3474-3475, 3477-3479, 3481-3482, 3484-3485, 3487-3489, 3491-3492, 3494-3495, 3497-3499, 3501-3502, 3504-3505, 3507-3509, 3511-3512, 3514-3515, 3517-3519, 3521-3522, 3524-3525, 3527-3529, 3531-3532, 3534-3535, 3537-3539, 3541-3542, 3544-3545, 3547-3549, 3551-3552, 3554-3555, 3557-3559, 3561-3562, 3564-3565, 3567-3569, 3571-3572, 3574-3575, 3577-3579, 3581-3582, 3584-3585, 3587-3589, 3591-3592, 3594-3595, 3597-3599, 3601-3602, 3604-3605, 3607-3609, 3611-3612, 3614-3615, 3617-3619, 3621-3622, 3624-3625, 3627-3629, 3631-3632, 3634-3635, 3637-3639, 3641-3642, 3644

- 262 *Pharmacology* (1) The Staff
Continuation of Pharmacology 261. One hour a week.
- 263 *Pharmacology Laboratory* (1) The Staff
Laboratory instruction and demonstration designed to complement Pharmacology 261. Open to qualified premedical students. Three hours a week.
- 265 *Chemotherapy* (1) The Staff
Lectures, one a week for three weeks. For premed students. Time to be arranged.
- 267-68 *Pharmacological Research* (part.) The Staff
Primary use (non-credit) method graduate and medical students seeking credits in pharmacology. Hours and credits to be arranged.
- 269-70 *Pharmacology Seminar* (1-1) The Staff
Recent advances in pharmacology. For those interested in pharmacological research. Open to qualified premedical students. Two hours a week.
- 28 *Special Methods in Research* (att.) The Staff
A course to familiarize the student with advanced chemical and physiological methods employed in pharmacological investigations. Open to qualified premedical students. Hours and credits to be arranged.
- 291-300 *Thesis* (1-3) The Staff
Research in Major or Area and Minor or Senior Honors.
- 339-40 *Therapeutics Conferences I* Staff of Pharmacology and Medicine
Conference designed to emphasize the application of pharmacological sciences to the problems of clinical medicine. One hour a week.

PHARMACY

Charles Watson Bliven, M.S., *Professor of Pharmacy, Executive Officer*
 Salvatore Joseph Greco, Ph.D., *Associate Professor of Pharmacy*
 Robert Meyer Leonard, Ph.D., *Associate Professor of Pharmacology and
 Pharmaceutics*
 Willis Eugene Moore, Ph.D., *Assistant Professor of Pharmaceutical
 Chemistry*
 Carson Gray Frisley, A.B., LL.B., *Lecturer on Pharmaceutical Law*
 Franklin Doro Gossert, M.S., *Instructor in Hospital Pharmacy*

SPECIAL LECTURERS

William Paul Briggs, M.S., S.D., LL.D., *Executive Director and
 Secretary, American Foundation for Pharmaceutical Education
 Pharmacy Training*
 Frederick John Cullen, Post.G., M.D., *Executive Vice-President, The
 Pharmaceutical Association Drug Manufacturers*
 John Christian Krautz, Jr., Ph.D., *Professor of Pharmacology, Uni-
 versity of Maryland; Pharmacological Research*
 Lucien Lawrence Powers, Ph.D., *Chairman, Committee on National
 Formulary, American Pharmaceutical Association; Official Drug
 Standards*
 Nevis Eugene Cook, B.S., B.S. in Phat., *Assistant to the Commissioner,
 Food and Drug Administration; Drug Control*
 Robert Philip Fischells, B.S., Phat.D., S.D., *Secretary and General
 Manager, American Pharmaceutical Association; Pharmaceutical
 Organizations*
 Daniel Lamont Seelinger, M.D., Dr.P.H., *Director of Public Health,
 District of Columbia; Hygiene and Sanitation*
 Percival Bryan Morehouse, LL.M., A.B., *Assistant General Counsel and
 Charge of Compliance, Federal Trade Commission; Drug Trade
 Regulation*
 Louis Edward Kazan, Ph.G., *Associate Editor, Drug Topics; Control
 Hospital Pharmacy*
 Karl Bartsch, Ph.D., *Executive Vice-President, American Drug Man-
 ufacturers Association; Pharmaceutical Industry*

*Outline of Science in Pharmacy (Syndicate of Pharmacy) — Presented at
 Pharmacy Convention by the American College of Pharmacy, 1934
 for the present was named in 1934 (1935)
 Outline of Science in Pharmacy (Syndicate of Pharmacy) — Presented at*

degree of Bachelor of Science from an accredited institution. The requirements for the degree are stated on pages 149-52.

FIRST GROUP

- 1-2 *History and Literature of Pharmacy* (2-1) Bliven
Orientation in pharmacy; a survey of the development of the profession of pharmacy and the literature of pharmacy. Morning.
- 21-22 *General Pharmacy* (4-4) Green, Cooper, Moore
Essential pharmaceutical processes; the theory and manufacture of pharmaceutical and laboratory essential preparations; the pharmaceutical uses of certain classes of substances and preparations. *Pharmacy 21*—Laboratory fee, \$10. Lecture (2 hours); laboratory (2 hours)—morning. *Pharmacy 22*—Laboratory fee, \$10. Lecture (2 hours); laboratory (6 hours)—afternoon.
- 23 *Pharmacology* (3) Leonard
Microscopic and macroscopic Pharmacology. Biology 1. Laboratory fee, \$10. Lecture (2 hours)—morning; laboratory (1 hour)—morning and afternoon.
- 25 *Pharmaceutical Calculations* (3) Bliven
The system of weights and measures and their application in the practice of pharmacy. Morning.

SECOND GROUP

- 101 *Inorganic Pharmaceutical Chemistry* (3) Moore
Inorganic chemistry as it applies to pharmacy. Study of reactions, preparations, and characteristics of inorganic pharmaceuticals. *Pharmaceutical Chemistry 101*. Laboratory fee, \$10. Lecture (2 hours)—morning; laboratory (1 hour)—afternoon.
- 102 *Dispensing Pharmacy* (4) Green
Composition of typical prescriptions and a study of incompatibilities. *Pharmaceutical Pharmacy 102*. Laboratory fee, \$10. Lecture (2 hours); laboratory (6 hours)—afternoon.
- 103 *Dispensing Pharmacy* (4) Green
Composition of Pharmacy fee. Laboratory fee, \$10. Lecture (2 hours)—morning; laboratory (2 hours)—afternoon.
- 104-6 *Pharmacology I* (2-2) Leonard
The general properties of pharmacology. Study of some drugs, their pharmacological actions, pharmacokinetics, and pharmacodynamics. *Pharmacology 104*. Laboratory fee, \$10. Lecture (2 hours)—morning; laboratory (2 hours)—afternoon.
- 107 *Pharmacy Administration* (1) Bliven
The general aspects involved in the operation of a pharmacy. Morning.

- 188 *Survey (1)* Bliven and Staff
A symposium covering the various phases of pharmacy. Required of all majors in Pharmacy. Morning.
- 190 *Hospital Pharmacy (1)* Cooper and Staff
Organization and functions of hospital, organization and operation of a hospital pharmacy, professional and student supplies. Preconfer. Pharmacy 1-2. Lecture (1 hour)—morning.
- 192 *Hospital Pharmacy: Prescription Practice (1)* Cooper
Prescription practice in the University Hospital Pharmacy. Preconfer. Pharmacy 1-2. Laboratory (3 hours)—time to be arranged. (Also offered 1955 summer term.)
Pharmacy 192X, same as 192, offered fall term. Time to be arranged.
- 194 *Manufacturing Pharmacy (3)* Cooper
The manufacture of bulk pharmaceuticals in the University Hospital Pharmacy. Elective for seniors. Lecture (1 hour)—morning; laboratory (6 hours)—time to be arranged. (Also offered 1955 summer term.)
Pharmacy 194X, same as 194, offered fall term. Time to be arranged.

THIRD GROUP

- 201-2 *Survey of Pharmaceutical Literature (1-1)* The Staff
Assigned library research on the development of pharmaceutical literature. (Not offered in 1955-56.)
- 203-4 *Special Problems in General Pharmacy (2-2)* Greco
Investigation of problems involved in the manufacture of pharmaceutical preparations on a laboratory scale. Laboratory fee, \$10.00 a term. (Not offered in 1954-55.)
- 206 *Pharmaceutical Technology (4)* Green, Cooper
A study of advanced manufacturing pharmacy, including formula development for the different types of preparations. Laboratory fee, \$10.00. Lecture (2 hours); laboratory (6 hours). (Not offered in 1955-56.)
- 215-16 *Advanced Pharmacology II (3-3)* Leonard
Special studies on biological assay methods. Laboratory fee, \$10.00 a term. Lecture (1 hour); laboratory (6 hours). (Not offered in 1955-56.)
- 221-22 *Chemistry of Naturally Occurring Organic Medicinal Products (5-5)*
A study of the isolation, chemistry, and relationships between the constitution and physiological action of alkaloids, glycosides, terpenes, anthraquinones, glycosides, and the various biological products. Laboratory fee, \$10.00 a term. Lecture (2 hours); laboratory (2 hours). (Not offered in 1955-56.)

223-24 Chemistry of Synthetic Organic Medicinal Products (5-5)

Moore

A study of the chemistry and relationship between the structure and physiologic action of hydrocarbons and their derivatives, nitrogen compounds, oxygen compounds, sulfur compounds, and organo-metallic compounds. Laboratory fee, \$16.50 a term. Lecture (3 hours); laboratory (16 hours). (Not offered in 1955-56)

226 Determination of Physical Constants (2)

A laboratory and lecture study of the determination of physical constants of medicinal products. Laboratory fee, \$16.50. Lecture (1 hour); laboratory (15 hours). (Not offered in 1955-56)

228 Food and Drug Analysis (4)

Bliven, Moore

A study of the composition of some common foods and food products. Laboratory fee, \$16.50. Lecture (2 hours); laboratory (16 hours). (Not offered in 1955-56)

231 Pharmacology of Anesthetic Drugs (4)

Leonard

Theoretical consideration of the principles of anesthesiology and laboratory studies of the action of anesthetic drugs. Laboratory fee, \$16.50. (Not offered in 1955-56)

234 Pharmacology of Autonomic Drugs (4)

Leonard

A study of action and interaction of drugs principally influencing the autonomic nervous system. Laboratory fee, \$16.50. (Not offered in 1955-56)

236 Experimental Toxicology (4)

Leonard

Pharmacological action of toxic drugs correlated with chemical and pathological studies. Laboratory fee, \$16.50. (Not offered in 1955-56)

251-52 Graduate Seminar (1-1)

The Staff

Current problems and trends in pharmacy. Required of all students registered for the Master's degree. (Not offered in 1955-56)

295-96 Research and Thesis (arr.)

The Staff

Investigations on special problems in the major field of interest and thesis preparation. Credit hours (but not exceed 6 credit hours) and fees to be arranged. (Not offered in 1955-56)

PHILOSOPHY

Charles Edward Gauss, Mus.B., Ph.D., *Elton Professor of Philosophy,*
Executive Officer

Herman Lynn Womack, A.M., *Associate in Philosophy*

Bachelor of Arts with a major in Philosophy (Columbian College—Field of Study).—Prerequisite: the Arts and Letters curriculum in the Junior College, or 100-104.

Required: in addition to the general requirements stated on pages 77-81, the grade of "pass" on the Philosophy major examination at the end of the senior year. The suggested knowledge items which the student will be examined on are arranged under the following general headings: (1) history of philosophy, (2) logic, and (3) theory of knowledge. (4) social philosophy. The Department of Philosophy provides a program (Philosophy 100-204) intended to assist the student in preparing himself for his major examination.

Master of Arts in the Field of Philosophy (Columbian College)—Prerequisite: an undergraduate degree in Philosophy at this University or the equivalent as judged by the faculty of this University's major examination in Philosophy. The following specific courses or the equivalent: Philosophy 111-112, 113, 121-22 and 131.

Required: the general requirements as stated on pages 84-87. At least 48 credits of the general curriculum count toward the senior work should be in Philosophy courses. Students electing independent courses are expected to do more intensive work than is demanded of undergraduates. A general written examination on the problems of the field of Philosophy and a departmental oral examination are required.

FIRST GROUP

- 51-52 *Introduction to Philosophy (3-3)* The Staff
A general introduction to the problems of modern philosophy in relation to scientific and social developments since the Renaissance. Monday and evening sections. (Also offered 1955 summer term—Philosophy 51-131.)

SECOND GROUP

- 111-112 *History of Philosophy (3-3)* GAUSS
History of western philosophy from Thales to Kant. Monday. (Also offered 1955 summer term—Philosophy 111-131.)
- 113 *History of Nineteenth and Twentieth Century Philosophy (3)* GAUSS
A history of ideas and influential expounding contemporary thought. (Not offered in 1955-56.)
- 121-22 *Logic and Scientific Method (3-3)* GAUSS
The study of formal logic and the methods of investigation and reasoning employed in the sciences; theory of scientific inference and induction. Tuesday.

- 131 *Ethics* (3) Womack
An examination of ethical theories, the relation of ethics to social science and psychology. Evening.
- 142 *Metaphysics* (3) Gause
Problems related to the formation of a world view. Emphasis on the area of modern science and the problems posed by contemporary philosophy. (Not offered in 1955-56.)
- 162 *Aesthetics* (3) Gause
The problems of appreciation and judgment in the arts, and the theory of the causes of artistic creation. Emphasis on contemporary arts and criticism. (Not offered in 1955-56.)
- 171-72 *American Philosophy* (3-3) Womack
A general history of philosophy in the United States, correlation with the history of European thought. (Philosophy 171 not offered in 1955-56.)
Summer term 1955—Philosophy 172. Evening.
- 180 *Philosophy of History* (3) Gause
Problems of historical knowledge and explanation. Critique of the theories of history. (Not offered in 1955-56.)
- 193 *Topics in Contemporary Philosophy* (3) Gause
(Not offered in 1955-56.)
- 199-200 *Preseminar: Readings for the Major* (3-3) Gause
Continuation and group discussion. Evening.

THIRD GROUP

- 201-2 *Readings and Research* (3-3) The Stud
Advanced readings and reports. Investigation of special problems. Time to be assigned.
- 211-12 *Seminar in Plato and Aristotle* (3-3) Gause
(Not offered in 1955-56.)
- 213-14 *Seminar in Seventeenth and Eighteenth Century Philosophy* (3-3) Gause
Evening.
- 215 *Seminar in Kant* (3) Gause
(Not offered in 1955-56.)
- 299-300 *Thesis* (3-3)

PHYSICAL EDUCATION FOR MEN *

William Henry Myers, A.M., *Professor of Physical Education for Men*

Joseph Henry Krupa, M.S., Ed.D., *Professor of Physical Education for Men, Executive Officer*

Milo Frederick Christiansen, B.S., M.R., *Professorial Lecturer in Physical Education*

Raymond George Hanken, B.S. in P.E., A.M. in Ed., *Associate Professor of Physical Education for Men*

Vincent James DeAngelis, B.S. in P.E., A.M. in Ed., *Assistant Professor of Physical Education for Men*

William Jennings Reinhart, B.B.A., *Associate in Physical Education for Men*

Eugene Hugh Sherman, Sr., B.S., *Associate in Physical Education for Men*

The Department monitors all the recognized athletic activities of the men students of the University.

Two years of Physical Education (Physical Education 1-2 and 11-12) are required of all men for graduation, except those students exempt under the regulations stated on pages 47-48.

Upon entering the University, all freshmen or other undergraduate students who have not received the Physical Education requirements are given a medical examination. Applicants for medical examinations will be given at the time of registration. The students who satisfy the requirements of the medical examination are then given a physical efficiency test in the general fields of agility, muscularity, and stamina, and in swimming. If the physical efficiency test is passed, the student may elect from the following list of activities:

- Swimming (freestyle, butterfly, etc.)
 - Body Building Exercises (gymnastic apparatus and weight training skills)
 - Competitive Exercises (football, soccer, and sports)
 - Swimming Exercises (distance, speed, and the crawl)
- If the physical efficiency test is not passed, the student will be assigned to a class for training in the above activities in the order listed.
- The Department furnishes gymnasium uniforms and personal equipment upon a cash payment.

Booklet or Syllabus in Physical Education (School of Education) - Prescribed for the Physical Education for Men curriculum in the Junior College, see pages 163-167. The measurements for the book are stated on pages 163-167.

FIRST GROUP

1-2 *Freshman Physical Education* (2-2)

The Staff

Four periods of instruction activity a week. Tukey and towel fee \$2.00 a year. Allowance for activities and shoes to be afforded.

* The University is not responsible for losses incurred in participation in organized games.
 † The University is not responsible for losses incurred in participation in organized games.
 ‡ The University is not responsible for losses incurred in participation in organized games.
 § The University is not responsible for losses incurred in participation in organized games.

- 11-12 *Sophomore Physical Education** (2-2) The Staff
Four periods of supervised activity a week. Locker and towel fee \$1.50 a term. Assignment for activities and time to be arranged.
- 43-44 *Techniques of Physical Education* DeAngelis, Krupa
Motor Activities (2-2)
Fundamental skills, rules, and organization. Locker and towel fee \$1.50 a term. Morning.
- 45-46 *Methods and Materials for Teaching Individual and Dual Sports in Secondary Schools* (2-2) The Staff
Tennis, golf, swimming, wrestling, football, bowling. Locker and towel fee \$1.50 a term. Afternoon.
- 47 *Introduction to Physical Education* (2) Krupa
An orientation course presenting the problems of physical education, traditional concepts, scientific foundations, and scope of field. Morning.
- 48 *Introduction to Recreation* (2) Harker
The role of recreation in modern living, current practices in recreation, recreation work, standards of training, experience, and types of facilities. Time to be arranged.
- 49 *Human Anatomy* (3) Stallings
The structure of the human body. Basic course for physical education majors. Not open to high men and women not majoring in Physical Education. Prerequisite: Biology 1-2 or Zoology 1-2. Morning.
- 50 *Kinesiology* (3) Lawrence
A study of the anatomical mechanics of movement, analysis of the action of muscles in physical education activities. Prerequisite: as above. Evening.
- 51 *First Aid and Care of Athletic Injuries* (2) DeAngelis, Lawrence
Prevention and emergency care of injuries of all types, with special reference to first aid, first aid, first aid, and nursing. A practical course. Prerequisite: Biology 1-2 or Zoology 1-2. Afternoon.

SECOND GROUP

- 101 *Physical Education in the Elementary School* (3) Atwell, Burtner
Physical growth and development of the child and adolescent. Study of the characteristics and presentation of physical education activities by the various age levels in elementary school, playground, and gymnasium. Methods and materials of teaching, games, and performing activities. Evening.

* Prerequisite and co-requisites for the School of Education and the School of Physical Education are: (1) The School of Education and the School of Physical Education, a course in physical education, and (2) the School of Education and the School of Physical Education, a course in physical education.

† The School of Education and the School of Physical Education are: (1) The School of Education and the School of Physical Education, a course in physical education, and (2) the School of Education and the School of Physical Education, a course in physical education.

- 103 *History and Principles of Physical Education* (3) Atwell, Krupa
Survey of history as it relates to contemporary physical education. Study of aims, objectives, and philosophy of physical education. Manning.
- 105-06 *Corrective Physical Education and Physical Examinations* (3-3) Lawrence
Cause and correction of faulty body position, physical examination methods for the diagnosis of postural defects, prevention of excessive and improper adjustment. Prerequisite: Biology 1-2 or Zoology 1-2. Manning.
- 107 *Techniques for Teaching Recreational Dance* (1) Burtner
Methods and materials for teaching the country and social dances of America and the folk dances of other countries to secondary-school age and adult groups. Synchronization calling is included. Locker and towel fee. \$3.00. Manning.
- 109-10 *Leadership Organization in the Intramural Program* (2-2) DeAngelis
Problems of administration, organization, and supervision of intramural activities in the physical education program of the junior high school, senior high school, and college. Manning.
- 113-14 *Methods and Practice in Teaching Physical Education Activities* (2 to 4-2 to 4) The Staff
Problems and methods involved in teaching and teaching physical education activities. Supervised laboratory. Locker and towel fee. \$3.00. Manning.
- 115-16 *Methods and Materials for Teaching Team Sports in Secondary Schools* (2 to 4-2 to 4) The Staff
Football, basketball, baseball, track and field. Locker and towel fee. \$3.00. Manning.
- 117 *Methods of Teaching Modern Dance* (1 to 2) Burtner
Techniques for the teaching of movement as a medium of expression. Practical work in basic techniques, combinations, and the analysis of contemporary dance including contemporary music and percussion. Application is made to both secondary school and adult age levels. Locker and towel fee. \$3.00. Manning.
- 118 *Dance Production* (1 to 2) Burtner
Choreography for dance recitals, musicals, and plays. The planning and staging of dance for TV, dance demonstrations and folk festivals. Lighting, costumes, etc. makeups for dance performances. Locker and towel fee. \$3.00. Manning.
- 121 *School and Community Health Programs* (3) Krupa
Health programs, teaching environment, health instruction, sources of material for general health knowledge. Prerequisite: Biology 1-2 or Zoology 1-2. Manning.

* The locker and towel fee is required for participation in one or more of the activities courses.

- 122 *Methods and Materials for Health Education* (3) Atwell
Organization and presentation of health materials for each age level.
Prerequisite: Biology 1-2 or Zoology 1-2. Evening.
- 131 *Tests and Measurements in Physical Education* (3) Atwell
Critical survey of tests in physical activities, methods of test construction, elementary statistics. Morning.
- 132 *Camp Leadership* (1) Atwell, Stallings
Survey course in camp counseling. Afternoon.
- 133-34 *Observation and Student Teaching* (3-3 to 6) Atwell, Myers
(3-3 to 6)
Assignments are made to schools in Washington and the vicinity.
Physical Education 134, student teaching fee, \$45. Time to be arranged.
Physical Education 1347, same as 134, offered fall term. Time to be arranged.
- 135 *Survey of Dance History and Dance Forms* (3) Burnett
The development of dance from primitive ritual to present day recreational and art forms of the world. Includes ethnology, dance music, and description of fundamental movement techniques and combinations to 1950-57 and alternate years.
- 138 *Organization and Administration of Physical Education* (3) Atwell, Myers
Organization and administration of physical education programs in elementary and secondary schools and in colleges. Study of materials, equipment, and program. Morning.
- 151-52 *Recreational Leadership Activities* (1 to 3-1 to 3) Christiansen
(1 to 3-1 to 3)
Fall term: basic skills for the pre-kind and school age child. 1-3: sensory practice in crafts, games, dramatics, physical and social activities. Spring term: basic skills for the teenage and adult. Activities: crafts, dramatics, physical and social activities. 1945-50 and alternate years. Evening.
- 161 *Community Organization for Recreation* (3) Christiansen
Recreation principles and methods in organizing community recreation centers. 1950-57 and alternate years. Evening.
- 162 *Administration of Community Recreation Programs* (3) Christiansen
Factors and problems in administering recreation including survey, legislation, program, personnel, facilities, maintenance, and public relations. 1950-57 and alternate years. Evening.

PHYSICAL EDUCATION FOR WOMEN*

Ruth Harriet Atwell, A.M., *Professor of Physical Education for Women, Executive Officer*

Helen Bennett Lawrence, A.M., *Professor of Physical Education for Women*

Elizabeth Burtner, A.M., *Associate Professor of Physical Education for Women*

Loretta May Stallings, A.M., *Instructor in Physical Education for Women*

_____, *Instructor in Physical Education for Women*

Helen Taylor Harris, A.M., *Associate in Physical Education for Women*

Camille Jacob Craig, A.M., *Associate in Physical Education for Women*

Two years of Physical Education (Physical Education 1-2 and 11-12) are required of all women for graduation, except students exempt under regulations stated in pages 47-48. In the fall a complete medical and physical examination is given, each student for the purpose of discovering individual needs. Those students whose examinations indicate the desirability of remedial or restricted activity are assigned to a program especially adapted to their needs. This limited program includes moderate sports and individual exercises in small groups under careful supervision.

For required costume for Physical Education classes may be purchased at the University Book Store.

Bachelor of Science in Physical Education (School of Education)—Prerequisite: the Physical Education for Women curriculum in the Junior College, see page 67. The requirements for the degree are stated on pages 105-67.

Within the curriculum leading to the degree of Bachelor of Science in Physical Education there is opportunity for specialization in dance, sports, activities, or recreation.

FIRST GROUP

1-2 Freshman Physical Education (1-1)

The Staff

One period of fundamental of health and physical education and two periods a week chosen from the activities offered each season.

Fundamentals of health and physical education, one term; an study of the nature involved in the general maintenance of health, efficient use of the body, and fundamental of movement; one term on fundamental dance. Morning and afternoon sessions.

Activities: basketball, basketball, body mechanics, canoeing, field hockey, folk and square dance, and modern dance, riding, swimming, synchronized swimming, tennis. Locker and towel fee, \$5.50 a term. Morning and afternoon sessions.

11-12 Sophomore Physical Education (1-1)

The Staff

Two periods a week chosen from the activities offered each season as listed under Physical Education 1-2. Locker and towel fee, \$5.50 a term. Two periods a week. Morning and afternoon sessions.

*The University is not responsible for injuries received as a consequence of participation in any of the activities of the departments of Physical Education, and the student assumes responsibility for such injuries.

†The locker and towel fee is retained for registration in one or more of the activity courses.

- 43-44 *Techniques of Physical Education Motor Activities* (2-2) The Staff
Fundamental skills, rules, and organization. Locker and towel fee.
\$1.50 a term. Time to be arranged.
- 47 *Introduction to Physical Education* (2) Krupa
An orientation course presenting the problems of physical education,
evolutionary analysis, scientific foundations, and scope of field. Morning.
- 48 *Introduction to Recreation* (2) Hanken
The role of recreation in modern life; current practices in vari-
ous recreation work; standards of training, experience, and qual-
ity of leadership. Time to be arranged.
- 49 *Human Anatomy* (3) Stallings
The structure of the human body. Basic course for physical educa-
tion majors. Also open to both men and women for credit in
Physical Education. Prerequisite: Biology 1-2 or Zoology 1-2.
Morning.
- 50 *Kinesiology* (3) Lawrence
A study of the anatomical mechanisms of movement; Analysis of the
action of muscles in physical education activities. Prerequisite:
anatomical course in anatomy. Morning.
- 51-52 *Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges* (2-2) The Staff
Track, tennis, basketball, hockey, softball, lacrosse, football, volley-
ball, American and dual sports, badminton, tennis, golf, water
sports, swimming and diving, rowing and water skiing, canoe
and sailing. Group approach. Practicum. Locker and towel
fee. \$1.50 a term. Afternoon.
- 53 *First Aid and Care of Athletic Injuries* (2) DeAngelis, Lawrence
Prevention and emergency care of injuries of all types with special
reference to first aid, first aid, first aid, and massage. A one-
term course. Prerequisite: Biology 1-2 or Zoology 1-2. Afternoon.

SECOND GROUP

- 101 *Physical Education in the Elementary School* (3) Atwell, Burnett
Physical growth and development of the child and adolescent. Sur-
vey of age characteristics and consideration of physical education
theories for the various age levels in elementary school programs
and attainment based programs. Methods and materials of teaching
various games and skill training activities. Morning and evening ses-
sions.

* The locker and towel fee is assessed for each session. It is not a term fee.

- 103 *History and Principles of Physical Education* (3) Atwell, Krupa
Survey of history as it relates to contemporary physical education. Study of aims, objectives, and philosophy of physical education. Morning.
- 105-6 *Corrective Physical Education and Physical Examinations* (3-3) Lawrence
Cause and correction of faulty body mechanics, physical examination methods for the diagnosis of postural faults, prescription of exercises, and program adaptation. Prerequisite: Biology 1-2 or Zoology 1-2. Morning.
- 107 *Techniques for Teaching Recreational Dance* (1) Bortner
Methods and materials for teaching the country and social dances of America and the folk dances of other countries to secondary school age and adult groups. Square dance calling is included. Locker and travel fee.* \$1.50 a term. Afternoon.
- 109-10 *Leadership Organization in the Intramural Program* (2-2) DeAngelis
Provision of administration, supervision, and supervision of intramural activities in the physical education program of the junior high school, senior high school, and college. Afternoon.
- 111-12 *Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges* (1 to 2-1 to 2) The Staff
Comparison of methods and materials in activities listed under Physical Education 31-42. Locker and travel fee.* \$1.50 a term. Afternoon. 1946-47 and alternate years.
- 113-14 *Methods and Practice in Teaching Physical Education Activities* (2 to 4-2 to 4) The Staff
Provision and materials needed to teaching and running physical education activities. Supervised laboratory. Locker and travel fee.* \$1.50 a term. Morning and afternoon sessions.
- 117 *Methods of Teaching Modern Dance* (1 to 2) Bortner
Techniques for the teaching of movement as a medium of expressive physical work in body mechanics, composition, and the analysis of contemporary and classic technique, movement, space, and performance. Application is made to both secondary school and adult age levels. Locker and travel fee.* \$1.50 a term. 1946-47 and alternate years.
- 118 *Dance Production* (1 to 2) Bortner
Classroom for dance, practice methods, and stage. The planning and staging of dance for TV, stage, demonstration, and film. Individual projects are made for dance production. Locker and travel fee.* \$1.50 a term. 1946-47 and alternate years.

*The locker and travel fee is assessed for registration in one or more of the physical classes.

- 121 *School and Community Health Programs* (3) Krupa
Health services, hospital environment, health instruction, sources of material for general health knowledge. Prerequisite: Biology 1-2 or Zoology 1-2. Morning.
- 122 *Methods and Materials for Health Education* (3) Atwell
Organization and presentation of health materials for each age level. Prerequisite: Biology 1-2 or Zoology 1-2. Evening.
- 131 *Tests and Measurements in Physical Education* (3) Atwell
Critical survey of tests in physical activities, methods of test construction, customary practices. Morning.
- 132 *Camp Leadership* (1) Atwell, Stallings
Survey course in camp instruction. Afternoon.
- 133-34 *Observation and Student Teaching* (2-3 to 6) Atwell, Myers
Adaptations for study in schools in Washington and the vicinity. Physical Education 133, student-teaching for 345. Time to be arranged.
Physical Education 134, same as 133, offered fall term. Time to be arranged.
- 135 *Survey of Dance History and Dance Forms* (3) Burner
The development of dance from primitive times to present day. Physical and art forms of the dance. Includes ethnohistory, social history and discussion of fundamental movement techniques and terminology. 1936-37 and alternate years.
- 136 *Organization and Administration of Physical Education* (3) Atwell, Myers
Organization and administration of physical education programs in elementary and secondary schools and in colleges. Study of health, fitness, treatment, and recreation. Morning.
- 151-52 *Recreational Leadership Activities* (1 to 3-1 to 3) Christensen
Fall term: basic skills for the personal and leisure time child. Leadership activities in games, sports, dramatics, physical and social activities. Spring term: basic skills for the teenage and adult. Activities in games, dramatics, physical and social activities. 1936-37 and alternate years. Evening.
- 161 *Community Organization for Recreation* (3) Christensen
Recreation, principles and methods in organizing community recreation services. 1936-37 and alternate years. Evening.
- 162 *Administration of Community Recreation Programs* (3) Christensen
Factors and problems in administering recreation including social implications, programs, 4095, business management, finance and administration. 1936-37 and alternate years. Evening.

PHYSICAL MEDICINE AND REHABILITATION

Charles Samuel Wise, B.S., M.D., *Professor of Physical Medicine and Rehabilitation, Executive Officer*

Josephine Jordan Buchanan, A.M., M.D., *Assistant Clinical Professor of Physical Medicine and Rehabilitation*

Francis Liell Wenger, B.S., M.D., *Assistant Clinical Professor of Physical Medicine and Rehabilitation*

Alvin Knudson, B.S., M.D., *Associate in Physical Medicine and Rehabilitation*

Jasper Wayne McFarland, B.S., M.D., *Clinical Instructor in Physical Medicine and Rehabilitation*

Charles Jerome Everding, B.S., M.D., *Clinical Instructor in Physical Medicine and Rehabilitation*

150 *Elements of Physical Medicine* The Staff
In accordance with the Anatomy Department, lectures and demonstrations of the various tests and measurements are employed in the treatment of various disorders. Emphasis is placed on spinal and extremity problems, nerve lesions, tele-diagnosis, muscle testing, joint range, and some physical ability measurements.

351-52 *Advanced Physical Medicine* The Staff
Lectures and demonstrations concerning the various techniques, clinical application of physical medicine and rehabilitation, to be interpreted with the results of the associated medical and surgical conditions.

47-48 *Clinical Studies* The Staff
Clinical studies and demonstration of the University Hospital.

485 *Research (M.T.)* The Staff
The student studies and assisted research projects. The student is to be trained.

PHYSICS

Thomas Benjamin Brown, Ph.D., *Professor of Physics, Executive Officer*
 George Gamow, Physics D., *Professor of Theoretical Physics*
 George Martin Koehl, A.M., *Professor of Physics*
 Zoltan Bay, Ph.D., *Research Professor of Physics*
 Lewis Slack, Ph.D., *Associate Professor of Physics*
 Edward Felix Turner, Jr., Ph.D., *Assistant Professor of Physics*
 ———, *Assistant Professor in Physics*
 Albert Prentice Kenyon, A.M., *Associate in Physics*
 John Newell Tevis, A.M., *Associate in Physics*
 DeWitt Fisher, A.M., *Associate in Physics*
 Walter Louis Asling, A.M., *Associate in Physics*

Bachelor of Arts in Bachelor of Science with a major in Physics (Columbia College—Department).—Prerequisites: the Arts and Letters of the Science curriculum, respectively, in the former College, see pages 64-65. The following courses must be included: Physics 9, 7, 8, and 55; Chemistry 21; Mathematics 13 and 22.

Required: for both the Bachelor of Arts degree and the Bachelor of Science degree, the general requirements as stated on pages 77-81, including Mathematics 112 and Physics 161, 155, 126, 113, 132, and 155 or 136, plus one of the following: Physics 122, 114, 118, 123, and 128.

Master of Science in the field of Physics (Columbia College).—Prerequisite: a Bachelor's degree with a major in Physics at this University or the equivalent.

Required: the general requirements as stated on page 74-87. The third year of required work must include Mathematics 171 (if not taken earlier) and Physics 411-42, 425 or 426, and 422-42.

Doctor of Philosophy (Graduate Council).—See page 9.

Bachelor of Science in Engineering with an option in Physics (School of Engineering).—See requirements, see pages 111-13, 130-17, 115.

Bachelor of Arts in Education with a teaching Area in Physics (School of Education).—Prerequisite: the Education curriculum, page 124-125.

Required: the Physics option, pages 122-23, and the professional course listed on page 124.

FIRST GROUP

5 General Physics (5)

An introduction to the phenomena of light, heat, sound, electricity, and the properties of matter. This course may be taken as a terminal course by non-science students who wish an introduction to the physical sciences. Prerequisite: high school algebra and plane geometry. Material for 50% Lecture (1 hour), recitation (1 hour), laboratory (2½ hours). Meeting: afternoon, and evening sessions. (Approved 1955 increase to 5.)

Physics 2x, same as 5, colored coding form. Lecture (1 hour) and evening sessions, recitation (1 hour)—meeting: 1955

ment, and evening sections, laboratory (2½ hours)—morning, afternoon, and evening sections.

- 6 *General Physics* (3) Slack and Staff
Mechanics, wave motion, and sound. Offered spring term. Prerequisite: Physics 5*, high school algebra and plane geometry. Material fee, \$10. Lecture (1 hour); recitation (1 hour); laboratory (1½ hours). Morning, afternoon, and evening sections.

- 7 *General Physics* (3) Turner and Staff
Elementary electricity and magnetism. Offered fall term. Prerequisite: Physics 5* high school algebra and plane geometry. Material fee, \$10. Lecture (1 hour); recitation (1 hour); laboratory (2½ hours). Morning, afternoon, and evening sections. (Also offered 1955 summer term.)

- 8 *General Physics* (3) Brown and Staff
This course is the fourth in the sequence of courses 5, 6, 7, and 8, and emphasizes the concepts beyond the fundamental principles studied in courses 5, 6, and 7, and the phenomena and theories of modern physics. Topics considered include electromagnetic waves (light, radio, and X-rays), atomic and molecular structure, radioactivity, nuclear physics, the quantum theory of matter and radiation, and the elementary particles such as electrons, protons, neutrons, and mesons. Prerequisite: Physics 6 and 7. Morning and evening sections. (Also offered 1955 summer term.)

- 55 *Physical Measurements* (3) Slack and Staff
Theory and methods of precise measurement in the several fields of physics. Prerequisite: Physics 6 and 7, and Mathematics 12. Material fee, \$10. Lecture (1 hour); laboratory (2 hours)—afternoon and evening sections.

SECOND GROUP

- 101 *Mechanics* (3) Slack
Statics, dynamics, kinematics of solids and fluids, and gravitation. Prerequisite: Physics 5; Mathematics 12. 1955-56 and alternate years, evening; 1956-57 and alternate years, morning.

- 102 *Heat and Thermodynamics* (3)
Thermodynamics, calorimetry, heat conduction, the laws of thermodynamics and application to physical systems. Prerequisite: Physics 5; Mathematics 12. 1955-56 and alternate years, Evening.

- 105 *Principles of Electricity* (3) Turner
Fundamental phenomena of electricity and magnetism, atomic theory, including elementary electromagnetic circuits, theoretical magnetism, electrostatics, electricity. Prerequisite: Physics 5; Mathematics 12. 1955-56 and alternate years, morning; 1956-57 and alternate years, evening.

* This prerequisite may be waived for students who have credit for a high school Physics course or who have completed laboratory work equivalent to the minimum required work of the first semester of the first-year course.

106 *Optics* (3)

Koehl

Geometrical optics; elementary theory of wave motions: interference, diffraction, polarization, and dispersion of light; laws of black body radiation. Prerequisite: Physics 8, Mathematics 27. 1955-56 and alternate years, morning; 1956-57 and alternate years, evening.

110X *Philosophical Foundations of Modern Physics* (3)

Gamow

A non-mathematical treatment. Einstein's ideas of space, time, and matter; the expanding universe; quantum theories concerning the structure of matter, protons, neutrons, mesons, and other elementary particles; the principle of uncertainty; statistical methods of physics; application of physics to the problems of living matter. Prerequisite: high school algebra and one year of college science. Not open to majors in physics or chemistry. Evening.

113 *Atomic Physics* (3)

Properties of the electron, and the other fundamental particles of physics; the photoelectric effect, X-rays and crystal structure; wave aspects of particles; elements of the quantum theory; atomic spectra and atomic structure. Prerequisite: Physics 8, Mathematics 27. 1955-56 and alternate years, evening; 1956-57 and alternate years, morning.

114 *Statistical Physics* (3)

Introduction to the applications of both classical and quantum statistics to the theory of gases, liquids, and solids. Topics discussed include fluctuations in gases and solids, distribution of energy, specific heats of solids, and experimental errors. Prerequisite: Physics 113. (Not offered in 1955-56.)

118 *Introduction to Solid State Physics* (3)

Turner

Survey of representative aspects of the physics of solids. Topics to be discussed include the lattice energy of ionic crystals, elastic properties of crystals, thermal, dielectric, magnetic properties, superconductivity, the electronic structure of metals, semiconductors. Prerequisite: Physics 113; Mathematics 27. 1955-56 and alternate years. The year.

123X *Nuclear Physics* (3)

Gamow

Structure and stability of nuclei; nuclear transformations; nuclear energy; nuclear reactions; astrophysical applications; nuclear forces. Prerequisite: Physics 113. Evening.

128 *Sound* (3)

Production, propagation, and detection of sound waves; vibrations of sounding bodies; acoustic measurements and acoustic phenomena. Prerequisite: Physics 8, Mathematics 27. (Not offered in 1955-56.)

132 *Electronics* (3)

Brown and Sudd

The phenomena of electron motion from solids, the physical properties of vacuum tubes, and the principles underlying their basic operation. Prerequisite: Physics 8 and 18, and Physics 103 or Electrical Engineering 10, Material Sci. 80. Lecture (2 hours); laboratory (1 hour)—morning and evening sections.

133 *Electronic Circuits* (3)

Brown

A continuation of Physics 132. Includes non-linear operation of electron tubes, the basic radiofrequency applications of electron tubes, and special types of tubes such as klystrons, magnetrons, and magnetrons. Lectures and problems. Prerequisite: Physics 132; Electrical Engineering 177, 1935-56 and alternate years, beginning 1956-57 and alternate years, even years.

136x *Electrical Conduction in Gases* (3)

Brown

Fundamental theory and principal applications. Ionization currents, Townsend currents, and positive columns; ion sheaths and probe measurements; glow discharges and sparks; ionization chambers, electron tubes, vacuum diodes, glow lamps, thyristors, and klystrons. Prerequisite: Physics 8, Mathematics 20. (Not offered in 1955-56.)

155-56 *Advanced Physical Measurements* (3-3)

Turner

Optical programs of experiments in electricity and magnetism, optics, or atomic physics. Current catalog prerequisites are Physics 105, 106, or 113. In addition, Physics 55 is a general prerequisite. Material fee, \$10. Saturdays.

191 *Nuclear Reactors* (3)

Neutron physics, reaction of neutrons, neutron reactions, slowing down and diffusion, introduction to transport theory, basic power reactor types, basic theory of homogeneous and heterogeneous reactors, including special numerical studies from recent publications. Prerequisite: Physics 8, Mathematics 20. (Not offered in 1955-56.)

THIRD GROUP

211 *Classical Physical Theory* (3)

Slack

Dynamics of systems of particles and of rigid bodies, general and rotational. Prerequisite: Physics 101; Mathematics 132, 171. (Mathematics 171 may be taken concurrently.) Even years.

212 *Classical Physical Theory* (3)

Slack

Dynamics of fluids, bodies and fluids, electromagnetic field theory. Prerequisite: Physics 101 and 105, Mathematics 132, 171. Even years.

213 *Electromagnetic Waves* (3)

Brown

Electromagnetic theory of light and radio waves, including an introduction to guided waves and cavity resonators. Prerequisite: Physics 105 and Mathematics 132, or their equivalents, 1935-56 and alternate years, even years.

221 *Wave Mechanics* (3)

Ganow

Continuation of classical limit of mechanics and a formulation of wave-mechanical equations, matrix mechanics and its relation to wave mechanics, introduction to systems problems of atomic, molecular, and nuclear physics. Prerequisite: Physics 103 and 211 or 12, 1955-57 and alternate years.

222 *Quantum Electrodynamics and Field Theories* (3)

Ganow

Relativistic wave equations, quantization of electromagnetic fields, interaction between matter and radiation, elementary particles and

- their total statistics. Prerequisite: Physics 221, 1957-57 and alternate years.
- 227 *Statistical Thermodynamics* (3) Gamow
 Approximate formulation of thermodynamics. Thermodynamic potentials and equilibria. The method of Gibbs. Statistical theory based on the Boltzmann distribution of particles. Bose-Einstein and Fermi-Dirac statistics. Applications to radiation, electron gas, etc. Prerequisite: Physics 102, 114; Mathematics 112, 1945-50 and alternate years. Evening.
- 228 *Relativity and Cosmology* (3) Gamow
 Lorentz transformation and four-dimensional formulation. Tensor calculus and the theory of curved space. Einstein's theory of gravitation. Relativistic mechanics. Theory of the expanding universe. Modern cosmological concepts. Relativistic thermodynamics. Prerequisite: Physics 211, 212, 1955-57 and alternate years. Evening.
- 255-56 *Graduate Laboratory* (4-4) Brown
 Spring and fall. This type of this course is required of all Master's students in physics. Not open for more than one Master's credit in a term. Seminars.
- 261-62 *Seminar: Recent Developments in Physics* The Staff
 (1-1)
 Individual presentations of special problems. All students required for a Master's degree in physics are expected to attend this seminar during the semester for the degree, and to take part in its discussion. Credit for participation in the seminar work is obtained by attending the seminar during the last two terms of preliminary the student's thesis. It is based upon the seminar work during the entire period of research. Alternate weeks, Monday evening.
- 299-300 *Thesis* (3-3) The Staff
 Thesis and lab to be presented.

PHYSIOLOGY

- Errett Cyril Albritton, A.B., M.D., *Fry Professor of Physiology*
 Chester Elwood Leese, Ph.D., *Professor of Physiology, Executive Officer*
 William Rankin Dwyer, Ph.D., *Research Professor of Physiology*
 Joseph William Still, M.D., M.P.H., *Assistant Professor of Physiology*
 Habeeb Baschus, Ph.D., M.D., *Assistant Research Professor of Physiology*
 Melvin Harold Heffer, Ph.D., *Assistant Research Professor of Physiology*
 Hyman Erwin Steinman, M.D., *Lecturer in Physiology*
 Charles Arthur Toompas, A.M., *Instructor in Physiology*
 Louis Pat Munan, M.S., *Associate in Physiology*
 William Spector, A.M., *Associate in Physiology*
 Francis DeSales Woidich, B.S., M.D., *Associate (Research) in Physiology*

Master of Arts or Master of Science in the field of Physiology (Columbia College)—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Biology, Chemistry, Physics, or Zoology from this University, or the equivalent. The undergraduate work should include the equivalent of Biology 1-2 or Zoology 1-2, and Zoology 41-42; Chemistry 11-12, 21, 31-32; Physics 5, 6, and 7. It is recommended that Biochemistry 211-22 be taken as an elective. A Bachelor's degree which includes the practical experience is acceptable for admission to candidacy.

Research—The general requirements are stated on pages 84-87. In addition to the thesis, the Master's thesis of research work should include Physiology 211, 221 or 222, 231, 234, 235, 236, 241, and at least three credits hours of research (Physiology 245 or eqv.). Biochemistry 211-22 is required unless it was included in the undergraduate program.

Doctor of Philosophy (Graduate Council)—See page 92.

115 Physiology (2)

Leese

Lectures for nonmedical students covering the fundamentals of physiology in the various subdisciplines. Prerequisite: one year of general science or the core of a biological science. Section A: Tues. and Thurs. 8:45 to 12 A.M.; section B: Tues. and Thurs. 3:15 to 5:45 P.M.

117 Experimental Physiology (1)

The Staff

Laboratory experience in the fundamentals of physiology for nonmedical students. Prerequisite: concurrent registration in Physiology 115 or the equivalent. Material fee, \$10.00. Sec. A: 10 to 12 A.M.

120 Physiology of Endocrine Activity (2)

Albritton, Munan

For nonmedical students. The laboratory includes reproduction, growth, and other adaptive, integrative and other forms, as well as the physiology of endocrine activity. Prerequisite: Physiology 115 or the equivalent. Tues. and Thurs. 6-10 P.M.

- 130 *The Psycho-physiology of Personality* (2) Leese
For nonmedical students. Lectures on the genesis and expression of personality, with emphasis on the physiological approach. *Physiological Psychology* 115 or the equivalent and general psychology. Two and three, 5 to 8 M.
- 150 *Advanced Physiology* The Staff
One hundred twenty-five physiological lectures and one lecture twenty-five laboratory periods devoted to the latest advances of the subject. For medical students.
- 201-2 *Experimental Method* (1-1) Albritton
For nonmedical graduate students. Design of controlled experiments in method of biological investigation; errors in design, criticism and judgment of evidence; and tests of the statistical significance of experimental results. See 400 8 M.
Prerequisite: 200, 202 or 203, offered spring term.
- 211-12 *Problems in Physiology* (art.) The Staff
For nonmedical graduate students. Open to undergraduate students with the approval of the Department. *Physiological Psychology* 115 and 117, or the equivalent. Time and credits to be arranged.
- 221-22 *Physiology Seminar* (1-1) The Staff
For nonmedical students undertaking graduate work in physiology. *Physiological Psychology* 115 and 117, or the equivalent. Work throughout the year.
- 231 *Advanced Physiology of Circulation and Respiration* (4) Albritton, Leese, and Staff
For nonmedical graduate students. Lectures on blood, heart, lungs, thoracic water, ventilation and acid-base balance. Four hours a week to be arranged.
- 234 *Advanced Physiology of Nutrition, Metabolism, and Excretion* (2) Leese, Still, Steinman
For nonmedical graduate students. Lectures on nutrition, digestion, metabolism, excretion, and temperature regulation. Two hours a week to be arranged.
- 235 *Advanced Physiology of the Endocrine Glands and Reproductive System* (1) Albritton, Still, and Staff
For nonmedical graduate students. Lectures on thyroid, parathyroid, adrenal, testes, and ovaries. One hour a week to be arranged.
- 238 *Advanced Physiology of the Neuro-muscular System* (2) Leese
For nonmedical graduate students. Lectures on sensory receptors, central nervous system, motor and sensory motor activities, and behavior of sensory and motor units. Two hours a week to be arranged.

- 240 *Advanced Experimental Physiology* (3) The Staff
For advanced graduate students. Laboratory work only. Correlated with the lectures in sections 241-245. Material fee, \$4. Nine hours a week to be arranged.
- 242 *Advanced Physiology of the Cell* (1) Dmyce
For advanced graduate students. Special emphasis on membrane and the functioning of the cell in relation to organ function. One hour a week to be arranged.
- 295-296 *Research* (var.) Albritton, Leese, and Staff
Topics and credits to be arranged.
- 299-300 *Thesis* (3-3) Albritton, Leese

POLITICAL SCIENCE

Warren Reed West, Ph.D., *Professor of Political Science*
 John Withrow Brewer, Ph.D., *Professor of International Law, Executive Officer*
 Arlin Rex Johnson, Ph.D., *Professor of Public Administration*
 Wolfgang Herbert Kraus, Dr. Jur., S.J.D., *Professor of Political Science*
 Karl Ernest Stromsem, Ph.D., *Professional Lecturer on Public Administration*
 Fred Latimer Hadsel, Ph.D., *Professional Lecturer in Political Science*
 Harvey Porter Hall, A.M., *Professional Lecturer in Political Science*
 William George Torpey, Ph.D., *Professional Lecturer on Public Administration*
 David Springer Brown, Ph.D., *Associate Professor of Public Administration*
 Howard Rowland Ludden, A.M., *Assistant Professor of Political Science*
 Floyd Millard Riddick, Ph.D., *Lecturer in Political Science*
 John Samuel Myers, Ph.D., *Lecturer on Public Administration*
 Milton Jacob Esmen, Ph.D., *Lecturer in Political Science*
 Richard Allen Fuller, Ph.D., *Lecturer in Political Science*
 Robert Amenit Kinney, A.B., *Lecturer in Political Science*
 Joseph Patrick Murphy, A.B., LL.B., LL.M., *Lecturer in Political Science*
 John Donald Young, M.S., *Lecturer on Public Administration*
 Simon Tucker, B.S.S., M.P.A., *Lecturer in Political Science*

Bachelor of Arts with a major in Political Science (Columbia College)—The curriculum is prescribed in the A.P. and Letters curriculum in the latest Catalogue, page 14, including Political Science 1-4.

Required, in addition to the general requirements, stated on page 77-81, four credit hours from the following groups designated as follows: (1) one hour from Group A; (2) one hour from Group B; (3) one hour from Group C; (4) one hour from Group D.

Group A: Political Science 111, 112, 117-18, 121-22. Group B: Political Science 171, 172, 181-82. Group C: Political Science 104, 107, 119, 120, 124, 125, 141, 142, 181-82, 183-84, 177, 178, 191, 194. Group D: Political Science 113, 116, 118, 119.

Students interested in preparing for graduate work in Public Administration will consult the Executive Officer of the Department for information as to the above requirements.

Bachelor of Arts with a major in Latin American Civilization (Columbia College)—The curriculum is prescribed in the Department of History, 1920, and 1921-22 Catalogues.

Major of Arts in the field of Political Science (Columbia College)—The curriculum is prescribed in the Department of Political Science at the University, in the catalogue.

Required, in addition to the general requirements as stated on pages 77-81, The above curriculum work must be approved in advance by the Advisory

Master of Arts in the field of Latin American Civilization (Columbian College)—See the Department of History, page 267.

Doctor of Philosophy (Graduate Council)—See page 23.

Bachelor of Arts and Master of Arts in Government in the field of Foreign Affairs, and Master of Arts in Public Administration with majors in General Administration and in Governmental Fiscal Administration (School of Government)—See page 177-81, 184-86, 188-89.

FIRST GROUP

- 9-10 *Government of the United States** (3-3) The Staff
Political Science 9, 10: Introductory principles of political science. The structure, powers, and operation of the Federal Government: Congress, the President, and the Supreme Court. Political science is analyzed in the structure, powers, and operation of state and local governments. Political parties, interest groups, and public policy. Major functions of government: public policy, and local levels. Minor and elective courses. (Also offered 1985 January term.)
Political Science 9B, 10B: 1985-86 offered spring term. Minor.
Political Science 10B, 10C: 1985-86 offered fall term. Minor.

SECOND GROUP*

- 104 *State and Local Government* (3) _____
State, municipal, and other local governmental forms, operations, and problems are studied with attention to public formation and administration, and to the forms of practical politics. Not open to students who have credit for Public Science 115. Minor.
107 *Problems in Modern Political Thought* (3) Kraus
Development of democratic thought, institutions and analysis of the state (reference to constitutional democracy in the 19th and 20th centuries).
Spring term, 1985.
111 *Introduction to Comparative Government* (3) Kraus
The government and politics of the principal constitutional democracies of Western Europe, with special attention to Great Britain and France. Minor.
112 *Introduction to Comparative Government* (3) Kraus
The government and politics of the principal political systems of Communist and Eastern Europe, Germany and the Soviet Union. Minor.
113 *Political Problems of the British Commonwealth of Nations* (3) Kraus
A description of the transformation of the Colonial Empire into the British Commonwealth, questions of racial partnership, and government and politics in the principal dominions.
Spring term, 1985.
117-18 *Political Theory: the Growth of Political Thought in the West* (3-3) Kraus
Political Science 117: From Classical Antiquity to the Middle Ages.
Political Science 118: From the Renaissance and Reformation to recent times. Minor.

* Political Science 9-10 is prerequisite to all second group courses.

- 120 *Foundations of American Democracy* (3) Brewer
An introduction to political thought in the United States, from colonial times to the end of the Civil War period. (Not offered in 1955-56.)

- 121-22 *The Constitution of the United States* (3-3) West
The judicial power of the federal courts in constitutional interpretation. Political Science 121 emphasis is placed on the separation of powers, federal-state relationships, and taxation. Political Science 122 emphasis is placed on federal powers over interstate commerce and on the constitutional protection of civil rights. Morning. (Also offered 1955 summer term—Political Science 121 (3).)

- 124X *Legislative Organization* (3) Riddick
A study of Congress: constitutional aspects, legal analysis of make-up, and political organization. Political and parliamentary procedures used in the preparation and enactment of legislation are examined. 1955-56 and alternate years. Evening.

- 127 *Commercial Law: Contracts, Sales, Agency, and Bailments* (3) Tucker, Murphy
Afternoon and evening sections.

- 128 *Commercial Law: Negotiable Instruments, Property, Mortgages* (3) Tucker, Murphy
Afternoon and evening sections.

- 129 *Law in Relation to the Form of Business Units: Corporations, Partnerships, and Trusts* (3) Murphy
Evening.

- 130 *Maritime Law* (3)
(Not offered in 1955-56.)

- 141 *The Development of Legal Institutions* (3) Brewer
An introduction to historical jurisprudence, with primary attention to the origins of the Roman Law of Continental Europe and of the Anglo-Saxon Common Law, 1675-50 and alternate years. Morning.

- 145 *Political Parties and Politics* (3)
Survey and analysis of organization and operations of political parties in the United States: major and minor parties, issues and campaign techniques and theories, influence on President and Congress. Not open to students who have credit for former Political Science 170 course. (Also offered 1955 summer term.)

- 146 *Political Pressures and Public Reactions* (3)
Public opinion, special interest groups, and pressure groups as they operate on government to influence public policy. Evening.

- 151-52 *Public Administration* (3-3) Murphy
Introductory survey of the theory and practice of governmental administration and its relation to politics, legislation, the courts, and the governmental organizations and interests. Morning.

- 161-62 *Administrative Law* (3-3) Murphy
A survey of the relationships between administrative and judicial power, with consideration of problems of separation of powers, delegation of power, and administrative power over private rights. (Political Science 161 not offered in 1954-55.) Political Science 162, evening.
- 171 *International Politics* (3) Ludden
Basic issues underlying the conduct of international relations and the formation of foreign policy: power politics, imperialism, collective security, and international cooperation. Evening. (Also offered 1955 summer term.)
- 172 *International Organization: the United Nations* (3) Ludden
Introductory study and analysis of the development and current operation of international organization within the system of sovereign states, with emphasis on the United Nations and other existing international and regional organizations. Morning and evening sections.
- 177 *Recent Trends in Latin American Politics and Government* (3) Davis
Types of governments, recent developments, and current political conditions in each of the twenty Latin American republics. May not be taken by students who have had Political Science 176 for credit. Evening.
- 178 *International Politics in the Western Hemisphere* (3) Davis
Political relations of the American Republics in the nineteenth and twentieth centuries, the development of Pan Americanism and the Organization of American States. May not be taken by students who have had Political Science 175 for credit. Evening.
- 181-82 *International Law* (3-3) Brewer
General survey of the public law of nations with particular emphasis on the law of peace. Neutrality and the uncodified law of war receive attention in the second term. Morning and evening sections. (Also offered 1955 summer term—Political Science 181 (3)).
- 191 *Government and Politics in the Middle East* (3) Hall
International relations and governmental problems of the Arab world and adjacent areas. Evening.
- 194 *Far Eastern Politics: Contemporary International Relations in the Pacific Area* (3) Kinney
Background and development of the major states of East Asia with reference to the constitutional systems and the foreign policies of the region. Evening.

THIRD GROUP

- 209-10 *Seminar: the Federal Government of the United States* (3-3) West
Advanced research emphasizing the legislative problems of Congress and the relations of Congress with the Administration. Evening.

- 212 *Seminar: Comparative Government* (3) Kraus
Selected topics and problems in the field of comparative political and administrative institutions and in the systems of modern constitutional governments and institutions. (Not offered in 1955-56.)
- 213 *Readings in Comparative Government* (3) Kraus
Readings and group discussions in the field of comparative political and administrative institutions, with particular attention to such matters as legislative, executive departments, bureaucracy, political parties, etc. Evening.
- 217 *Seminar: Topics in Political Theory* (3) Kraus
Research and discussion primarily concerned with problems of modern political and constitutional theory, including the theoretical aspects of organizational government, democracy, socialism, and constitutionalism. Evening.
- 220 *Reading Course in Political Theory* (3) Kraus
Readings and group discussions primarily in the field of modern political and constitutional theory from the seventeenth century to the present. (Also offered next summer term.)
- *226 *Problems of Governmental Reorganization* (3) Torrey
Intensive consideration of the new Hoover Commission report (1954) and other studies of federal reorganization, structure and role in the modern state. Evening.
Summer term 1955.
- *239-40 *Principles and Problems of Personnel Administration* (3-3) Torrey
Principles and functions of personnel administration, formal and informal organization for personnel management; staff-concept; evaluation of personnel procedures, and problems of personnel administration. Evening.
- *241 *Human Relations in Administration* (3) Torrey
Attention to human problems in human relations in work situations; problems of communication, coordination, etc. Evening.
- *243 *The Supervision of Federal Personnel* (3) Torrey
A study of the methods of supervising supervisory agencies with particular attention to such matters as personnel relationships, group personnel, work measurement, and resultant governing federal personnel management. Evening.
- *245 *Advanced Organization and Management* (3) Torrey
The technique of organization survey and work analysis, the development of methods of supervising supervisory effectiveness, and the application of principles of scientific management to the Federal Government. Evening.
Political Science 245, same as 245, offered spring term.

- 251-52 *Budget Formulation and Fiscal Control* (3-3) Myers
Principles of federal budget formulation, problems and practices in the administration and execution of the budget at various levels, processes of budgetary evaluation, performance budgeting and related accounting systems.
- 253 *Staff Functions in Government Administration* (3)
Designed primarily to give the candidate a broad understanding of the nature and use of the traditional staff functions, such as including: research, management analysis, auditing, purchasing, etc. Evening.
- 255 *Administrative and Organization Theories and Problems* (3) Brown
Theories and principles of administration, analysis of problems in administration and agency organization, problems of coordination, general issues of government organization, and executive qualitative studies. Evening.
- 256 *Public Policy Formulation and Administration* Brown (3)
The development and administration of public policy, public opinion, and pressure groups, relations with Congress and the courts, by which the executive controls the operation of the program. Not open to students who have credit for Political Science 117. Evening.
- 258 *Public Relations in Government Administration* (3) Steppert
The theories, techniques, and issues related to various public administration systems in the development and administration of public programs at various levels, an evaluation of various public information systems. Evening.
- 262 *Reading and Conference Course in Public Personnel Administration* (3) Torrey
Reading and conference to develop familiarity with selected literature in the field of public personnel administration. Evening.
- 263-64 *Analysis of the Administrative Processes* (3-3) Steppert
Open only to persons selected by government agencies for their present program. Thesis to be assigned.
- 265-66 *Workshop in Public Administration* (1-3) Brown
Required of all AM students in public administration. As a part of the seminar the student undertakes the investigation of specific public work in administration. Training is also provided in critical research and in conference composition. Evening.
- 271-72 *Problems in International Politics and Organization* (3-3) Haisel
A seminar designed to develop technology of research in current international affairs, and to examine current developments in international relations for impact on the field of Government.

- public and international, such as the United Nations and specialized agencies. Evening.
- *274 *Methods and Objectives of Foreign Policy* (3) Hadsel
Systematic examination of the objectives of foreign policies of the major powers, with particular attention to the political, propaganda, economic, and military methods used to pursue these objectives. Evening.
- 277 *Seminar: Latin American Government* (3) Davis
Institutional and concepts of the political structures of selected Latin American republics. Two comparable governments will be studied each year. Evening. (Also offered 1955 summer term.)
- 278 *Seminar: Latin American Political Philosophy* (3) Davis
History of political perceptions and philosophies of 19th and 20th century Latin America. Evening.
- *279 *Reading Course in International Affairs* (3) Hadsel
Intensive reading and discussion of basic materials designed to furnish an outline interpretation of particular problems in the nature and development of international law and politics; the growth and operation of international organizations. Evening.
- 281-82 *Seminar: International Law and Relations* Brewer
(3-3)
Research topics in the public law of nations, with special attention to problems of pacific settlement, sanctions, war, neutrality, and internationalization, and to their political implications. Political Science 281 (3) offered summer term 1955 and offered fall term 1955-56.
Political Science 282—1955 summer term.
- 293-94 *Seminar: International Politics and Government in the Pacific Area* (3-3) Kinsey
Research and analysis of the major patterns of development in international politics of the area, with advanced study of the governmental institutions of the Far East. Evening.
- 299-300 *Thesis* (3-3) The Staff
Topic to be assigned. (Also offered 1955 summer term.)

COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above the University offers the following courses especially for students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, Military Economics and Politics Program, and Engineering Administration.

214 *Control Systems in the Soviet Bloc* (3)

259 *Readings and Conference in Comptrollership* (3)

*Prerequisite for studies in the School of Government.

PSYCHIATRY

- Winifred Overholser, A.B., M.D., Sc.D., *Professor of Psychiatry, Executive Officer*
- Solomon Katzenelbogen, M.D., *Clinical Professor of Psychiatry*
- Addison McGuire Duval, M.D., *Clinical Professor of Psychiatry*
- Leon Yochelson, A.B., M.D., *Clinical Professor of Psychiatry*
- Sidney Berman, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Morris Kleinerman, Ch.D., M.B., *Assistant Clinical Professor of Psychiatry*
- Henry Prather Laughlin, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Marshall de Graffenried Rafin, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Jay Louis Hoffman, A.B., M.D., *Assistant Clinical Professor of Psychiatry*
- Eliner Klein, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Anna Coyne Todd, A.B., M.D., *Assistant Clinical Professor of Psychiatry*
- Norman Tach, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Harold Corson, M.D., *Assistant Clinical Professor of Psychiatry*
- Anna Genevieve McElwain, A.B., M.D., *Associate in Psychiatry*
- Sarah Shtoffler Tenenblatt, A.B., M.D., *Associate in Psychiatry*
- David Eden, A.B., M.D., *Associate in Psychiatry*
- Robert Milton Grossberg, A.B., M.D., *Associate in Psychiatry*
- Helen Pallister, Ph.D., *Clinical Instructor in Psychiatry (Psychologist)*
- Richard Allan Rogers, B.S., M.D., *Clinical Instructor in Psychiatry*
- Richard Graham Board, B.S., M.D., *Clinical Instructor in Psychiatry*

- 176 *Development of Personality & Development* Barman
An introductory course in the anatomical, physiological, and psychological growth and development of personality. Consideration of characteristics of structure, function, and development in the normal brain as a basis for the study of the pathological. Discussion of interpersonal relationships. One hour a week.
- 178 *Psychopathology* Hoffman
Manifestations and understanding of various mental conditions and abnormal reaction types, grounded by history of development of pathophysiology and associated with case material. One hour a week.
- 206 *Psychiatry* Overholser
History, etiology, symptoms, course, and treatment of the major psychosis with emphasis on the clinician meeting the patient at a time. One hour a week.

- 268 *Demonstration Clinics* M-Eldowney, Tenenblatt
Presentation of clinical cases of major mental illnesses and prominent behavior disturbances, comparing with Psychiatry 266. Each year only excellent patients under supervision. Three hours a week. St. Elizabeth's Hospital.
- 271 *Psychomotor Aspects of General Medicine* Katzenelbogen
Somatic basis of psychiatric illness. The role of personality factors in functional and organic disorders. One hour a week.
- 324 *Psychoneurosis* Laughlin
History, psychopathology, clinical aspects, and treatment of various types of psychoneurosis. One hour a week. Medical Conference Room, D. C. General Hospital.
- 431-32 *Clinical Clerkship* Daval, Kleinerman, Yochelev, Rubin, Turb, Coran, Pallister, Eden, Greenberg, Rogers, Beard
Supervised consultation, diagnosis, and treatment of ambulatory psychiatric cases in University Hospital and hospitalized cases at St. Elizabeth's Hospital. Conference for discussion of cases. Clinical application of psychiatric principles to general medical practice is stressed. Four weeks divided among University Hospital, Harvard and Massachusetts Psychiatric Institute and St. Elizabeth's Hospital.

PSYCHOLOGY

Mitchell Dreese, Ph.D., *Professor of Educational Psychology*
 Thelma Hunt, Ph.D., M.D., *Professor of Psychology, Executive Officer*
 Henry Furness Hubbard, Ph.D., *Professorial Lecturer in Psychology*
 Margaret Ives, Ph.D., *Professorial Lecturer in Psychology*
 Curtis Edward Tuttle, Ph.D., *Associate Professor of Psychology*
 Don Carlos Faith, Ph.D., *Associate Professor of Educational Psychology*
 Willard Edmund Caldwell, Ph.D., *Associate Professor of Psychology*
 James Norman Mosel, A.M., *Associate Professor of Psychology*
 Bernard Hayman Fox, Ph.D., *Assistant Professor of Psychology*
 Eva Mayne Johnson, A.M., *Assistant Professor of Psychology*
 Clyde Lindley, A.M., *Lecturer in Psychology*

Bachelor of Arts with a major in Psychology (Columbia College—Department of Arts)—Prerequisite: the Arts and Letters curriculum in the Junior College, or page 64, including Psychology I and 2 or 22, Statistics 33.

The general requirements for the degree are stated on pages 77-81. The study program spans four years and includes twenty-four hours in Psychology, namely 2 or 22, including Psychology 33 or 34, 35, 36, 37, 38, 39, 40, 41, 42, and 43, and Psychology 115 or Psychology 118.

Master of Arts or Master of Science in the field of Psychology (Columbia College)—Prerequisite: the degree of Bachelor of Arts with a major in Psychology at the University, or the equivalent.

Required: the general requirements for the degree are stated on pages 84-87. Of the twenty-four required credit hours (exclusive of the thesis), a minimum of eighteen must be in the department through a minimum of twelve hours in psychology, including Psychology 2 or 22, twelve may be in related fields approved by the Department.

Master's programs are available by the following fields of concentration: (1) theory and experiments, (2) counseling and guidance, (3) clinical diagnosis, (4) child, (5) personality, (6) experimental, and (7) statistics. For detailed requirements consult the Executive Officer of the Department.

Doctor of Philosophy (Graduate College)—See page 93.

Bachelor of Arts in Government with a major in Business Administration (Fordham University)—See page 17, 18, 19.

Master of Arts in Personnel Administration or Master of Arts in Government with a specialty in Counseling, Employment, or International Communication (Fordham University)—See pages 194-95, 197-98, 199.

Master of Arts in Education in the field of Employee Training and of Guidance (Fordham University)—Prerequisite: a Bachelor's degree from an accredited institution and two years of full-time working experience. The requirements for the degree are stated on page 199-200.

FIRST GROUP

1. General Psychology* (13)

The following psychology courses including human behavior, learning and organization. (Also offered next summer term.)

The Staff

* Psychology 1 is a prerequisite to all other courses in Psychology.

- Psychology 1x, same as 1, offered spring term. Morning and evening sections.
- 2 *Applied Psychology* (3) The Staff
The applications of psychology in business, industry, medicine, law, education, literature, and social problems. Morning and evening sections. (Also offered 1955 summer term.)
- Psychology 2x, same as 2, offered fall term. Morning and evening sections.
- 22 *Introduction to Educational Psychology* Faith, Lindley
(3)
Consideration of individual and group differences, adjustments, and the psychology of learning in relation to education and training. Morning.
- Psychology 22x, same as 22, offered fall term. Evening.
- 29 *Child Psychology* (3) Johnson
A systematic approach to the study of the child. Special emphasis placed on the evolutionary process, learning, and the child's view of the world. Evening. (Also offered 1955 summer term.)
- Psychology 29x, same as 29, offered spring term. Morning.
- 98 *Abnormal Psychology* (3) Hunt, Johnson
The causes, diagnosis, treatment, and prevention of the various types of mental disorders and mental disorders. Psychology 4, course in psychology, or 3 credits in psychology and 6 credits in a liberal arts program. Morning. (Also offered 1955 summer term.)
- Psychology 98x, same as 98, offered fall term. Morning and evening sections.

SECOND GROUP *

- 118 *Physiological Psychology* (3) Fox
Structure, function, and physiology of sensory, nervous system, and effects on indicators of behavior, including drives, learning, and other. Evening.
- 121 *Educational Psychology* (3) Faith
Advanced course in educational psychology. Open only to students who have completed a study plan in a liberal arts program. Evening.
- 129 *Introduction to Counseling and Guidance* (3) Dreese
A survey of the basic principles, techniques, and procedures as applied to vocational, educational, and personal counseling. Evening.
- 131 *Psychological Tests* (3) Hunt
A survey of psychological tests and their uses in research, industry, government, law, education, and education. Morning.
- Psychology 131x, same as 131, offered spring term. Evening.

*The courses in this group are given only in all second-group courses.

- 141 *Leadership, Group Behavior, and Student Life* Faith
(3)
A survey of the foundations of leadership, of the factors which underlie effective participation in group activities, and of the interrelations between the student and his university. Morning.
- 144 *Personnel Psychology* (3) Hubbard, Mosé
The application of psychology to personnel work in education, business, industry, and government. Morning. (Also offered 1955 summer term.)
Psychology 144X, same as 144, offered fall term. Evening.
- 147 *Principles in Human Relations* (3) Mosé
The application of psychological principles to understanding and improving personal and social relations. Emphasis will be upon the student and social problems drawn from life situations, with important attention to university and administrative relationships. Prerequisite: Psychology I (or Psychology 145 for students in the special programs).
Psychology 147X, same as 147, offered fall term. Morning.
- 148X *Psychology of Advertising and Market Research* (3) Mosé
The motivational and social dynamics of consumer behavior. Evaluation of the psychological effectiveness of products, media, and advertising and public relations programs. Consideration of current techniques and findings in motivational research. 1955-56 and alternate years. Evening.
- 151 *Social Psychology* (3) Tuthill
The social foundations of attitudes and behavior. Individual adjustment to group situations such as the family, school, university, and occupation. The psychological basis of race prejudice, nationalism, and war. Morning. (Also offered 1955 summer term.)
Psychology 151X, same as 151, offered spring term. Evening.
- 156 *Psychology of Propaganda and Public Opinion* (3)
The psychology of opinion formation, the measurement of opinion, the social determinants of attitudes, the psychological processes in propaganda, the basis of sensitivity to propaganda, psychological warfare. Evening. (Also offered 1955 summer term.)
- 161 *Comparative Psychology* (3) Caldwell
A survey of psychological processes in subhuman organisms, with special emphasis on the evolution of animal behavior from the lowest forms to man. Accompanied by laboratory work. Material fee \$5. Time to be arranged. (Also offered 1955 summer term.)
- 171X *Psychology of Personality* (3) Caldwell
Contemporary approaches to the study of personality. Prerequisite: 12 credits in psychology, including Abnormal Psychology. Morning.
- 191 *Experimental Psychology* (3) Tuthill
The application of experimental methods to various psychological problems. Prerequisite: 12 credits in psychology and an elementary course in statistics. Material fee \$5. Afternoon.

192 *Problems in Experimental Psychology* (3). Caldwell. Fox
Opportunity for work on individual differences in
human psychology. 1941 to 1942. Open each term to a small group
of students by permission of the department. There to be conducted
Psychology 1942 same as 1942 offered in full term.

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* Data only for studies between 1970 and 1980, mostly in Europe, east of the
continent of Africa and between latitudes of the Tropic.

- 212X *Seminar: Personality Evaluation by Projective Techniques* (3) Ives
Evening
- 213 *Seminar: Clinical Psychology* (3) Ives
A study of the clinical applications of non-projective tests. 14th-47.
and discussion years.
- 214X *Seminar: Advanced Study of Projective Techniques* (3) Ives
Primary emphasis upon the Rorschach Test. Presentation: Psy-
chology 212. Evening
- 220 *Seminar: Abnormal Psychology* (3) Hunt
An intensive study of a selected problem in the field of abnormal
psychology. Evening
- 223 *Seminar: Learning* (3) Fox
Current theories of learning. Evening
- 225 *Seminar: Mental Hygiene* (3) Caldwell
A study of mental health problems with special attention to diagnosis
of psychosis. Evening. (Also offered Ives session term.)
- 226 *Seminar: Clinical Psychology of Childhood* (3) Johnson
A survey of children's behavior and personality disorders. Evening
- 227X *Seminar: Counseling and Guidance* (3) Dreese
Recent developments and current problems in vocational, educa-
tional, and personal guidance in various types of agencies and per-
sonnel relations in education. Presentation: structured as lecture,
social measurements and Psychology 100 or the equivalent. Evening
- 228 *Seminar: Techniques of Counseling* (3) Dreese
Several types of vocational, educational, and personal counseling
problems approached through the case method. Presentation: semi-
structured, using measurement and statistical and familiarity with case
study analysis methods. Evening
- 229X *Seminar: Occupational and Educational Information* (3) Fulish
Describes techniques vocational and educational counseling with the
help of vocational and educational information resources in coun-
seling. Sources of data and techniques of collecting, analyzing, and the
application to personnel problems. Evening
- 231 *Test Construction* (3) Hunt
The principles underlying test construction; statistical techniques in
the construction, evaluation, and standardization of psychological educa-
tional, and vocational tests. Presentation: a course in tests and
measurements and a course in statistics. Evening
- 232 *Research: Test Construction* (3) Hunt
Individual projects in construction and evaluation of psychological,
educational, or vocational tests. Presentation: Psychology 131. Class

each term on individual study plan to a small number of students by permission of instructor. Time to be arranged.

- 233 *Individual Psychological Testing* (3) Johnson
Instruction and practice in giving of the Binet Test and the Wechsler-Bellevue Test. Prerequisite: an elementary course in tests and measurements. Material fee, \$6. Alternate.
Psychology 233X, same as 233, offered spring term. Alternate.

- 234 *Seminar: Test Theory* (3) Mosell
1956-57 and alternate years

- 236X *Seminar: Analysis of the Individual for Purposes of Counseling* (3) Faith
A detailed study of individual analysis techniques with practice in handling such methods. Prerequisite: an introductory course in psychological or psychological measurements. Evening.

- 244 *Seminar: Job Analysis and Evaluation* (3) Mosell
Offered 1955 summer term.

- 245X *Seminar: Employee Motivation and Morale* (3) Mosell
Attention to the principles of primary group functioning as organizational administration to the problem of motivating employees. Reading, writing, and completing human relations. Emphasis on use of group dynamics in supervision and leadership. Evening.

- 246X *Seminar: Personnel Measurement Techniques* (3) Mosell
Detailed consideration of interview, personnel data analysis, test use, and questionnaires in evaluating employees, job positions and worker morale. Evening.

- 251 *Seminar: Advanced Social Psychology* (3) Tisdell
Current research and theory in social psychology; group dynamics; measurements; social structure; and social interaction theory. Evening.

- 254 *Seminar: Group Dynamics* (3) Tisdell
The experimental study of group dynamics; systematically and descriptively group dynamics; interaction; group analysis. Lerner's model; group processes in individual and group processes. 1955-56 and alternate years. Evening.

- 255 *Seminar: Techniques of Opinion and Attitude Measurement* (3) Tisdell
Methods of attitude measurement; interviews; questionnaires; self-reports; as currently used by private and government organizations. The place of attitude studies in schools, industry, government, etc. 1956-57 and alternate years.

- 261X *Seminar: International Communication* (3) Mosell
Techniques and principles of cultural and strategic, psychological, psychological and educational specialization of human behavior and communication; the psychological effects of group systems. Evening.

- 272x *Seminar: Theories of Personality* (3) Caldwell
A survey of the various theories of personality, with emphasis upon theoretical problems and methodology in the field of personality study, Evening.
- 295-96 *Research in Psychology* (arr.) The Staff
Individual research by student carried out under supervision of staff members. Time and credits to be arranged. (Also offered 1955 summer term—Psychology 295 (arr.))
- 297-300 *Thesis* (3-3) The Staff
Time to be arranged. (Also offered 1955 summer term—Psychology 299 (3).)

COURSE OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above the University offers the following course, which is available only to students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, Military Economics and Politics Program, and Engineering Administration.

- 145 *Principles of Human Relations* (3)

RADIOLOGY

William Woodrow Stanbro, M.D., *Professor of Radiology, Executive Officer*

Solomon Rodney Bersack, B.S., M.D., *Assistant Clinical Professor of Radiology*

Ludwig Carl Kroutil, A.B., M.D., *Assistant Clinical Professor of Radiology*

Charlotte Patricia Donlan, A.B., M.D., *Assistant Clinical Professor of Radiology*

Alvin Charles Wyman, A.B., M.D., *Associate in Radiology*

George Tievsky, M.D., *Clinical Instructor in Radiology*

Uthai Vincent Wilcox II, M.D., *Clinical Instructor in Radiology*

115-116 *Anatomy*

Comparative, Gross and Roentgen anatomy

The Staff

220 *Principles of Radiology*

Lectures and discussion

The Staff

313 *Advanced Radiological Diagnosis*

Lectures and discussion

The Staff

421-22 *Clinical Studies*

Students are assigned to the X-ray Department in rotation and are required to be a specific period.

The Staff

RELIGION

Joseph Richard Sizoo, A.M., S.T.D., D.D., Litt.D., *Milbank Professor*
of Religion

Clifton Earl Olmstead, A.B., Th.D., *Associate Professor of Religion*
Executive Officer

David Hirsch Pinner, A.M., S.T.B., D.D., *Lecturer in Religion*

David Hirsh Panitz, A.M., Rabbi, *Lecturer in Religion*

Lecturer on Religion
 Lecturer on Religious Education

Received the amount of \$10.00 from the
 Treasurer of the Arts and Letters Committee in the Junior Chamber, Inc.
 1914-1915

Related: the national requirements as stated on pages 77-84, including a minimum of fourteen credit hours in relevant lower-level first-group courses.

FIRST GROUP

- 9 The Old Testament (3)

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- 10 *The New Testament* (3)

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A New Testament (3)
of various Eastern churches there, and presenting value, special
interest in the approach, the structure, and the formation of the
and a more than one. And ultimately your mission, 1960-72.
H.

- 59-60 History of Religion (3-5)

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History of Religion (3-5) Olinsted
Full-time, intensive and varied national courses. Conferences: Lutherans, Baptists, Methodists, and Presbyterians; international settings: Asia, India, China, Africa, and Latin America; and regional settings: New England, Midwest, and South. Morning and evening sessions.

SECOND GROUP

- 123 *The Prophets, Their Times and Their Message* (3)

19

Metzger (3) Patz
The development of property in the Old Testament, almost none
of the value in the present, however. A few of the present
will be needed for the present study. *Exodus*

- 104 *The Life and Thought of Jesus* (3) Kean
A comprehensive study of the life and teachings of Jesus as they relate to problems of belief, standards of value, and patterns of life, the significance of the message of Jesus for our own times. Evening
- 121 *Problems of Western Religious Thought* (3) Olmstead
The nature of religious truth and experience, the existence, character, and activity of God; the predicament of modern man; the problem of evil and suffering; eternal life; science and religion; the meaning of worship; religious views of history.
Summer term 1955.
- 122 *Christian Ethics and Modern Society* (3) Olmstead
A study of the nature and principles of the Christian life as developed by the Christian community, problems of personal conduct, the obligations of the Christian toward his family, social, and economic institutions. (Not offered in 1955-56.)
- 131 *History of Christianity to the Reformation* (3) Olmstead
The rise and expansion of Christianity; the development of Christian thought; the evolution of church organization and worship; the Reformation and post-Reformation thought. Morning
- 132 *History of Christianity Since the Reformation* (3) Olmstead
(3)
The origin and development of Protestantism; the Roman Catholic revival; the status of the Eastern churches; doctrine, worship, evangelism, thought and state, and reaction to modern thought and life. Morning
- 141-42 *Religious Education* (3-3)
Principles and practice of religious education in the home, church, and community; basic educational principles and special religious instruction and administration of religious education. Morning
- 172 *Religion in American Culture* (3) Olmstead
Growth of religious bodies and movements in American culture; the heritage of religious freedom and democracy; religious and historical movements and influences; science and religious thought; divisions and unifying movements in religion. Morning
- 195-96 *Undergraduate Seminar in Religion* (3-3) Sizer
The development of religious concepts in the history of Christian civilization. Admission by permission of the instructor. (Not offered in 1955-56.)
- 197-98 *Undergraduate Seminar in Religion* (3-3) Olmstead
Selected problems and problems in the history of Christian thought. Admission by permission of the instructor. (Not offered in 1955-56.)

ROMANCE LANGUAGES AND LITERATURES

Henry Grattan Doyle, A.M., LL.D., Litt.D., *Professor of Romance Languages*

Merle Irving Protzman, Ph.D., *Professor of Romance Languages*

Louis Clark Keating, Ph.D., *Professor of Romance Languages, Executive Officer*

Alan Thomas Deibert, A.M., *Professor of Romance Languages*

Antonio Alonso, A.M., *Associate Professor of Spanish*

Rafael Supervia, Doctor en Derecho, *Associate Professor of Spanish*

James Willis Robb, A.M., *Assistant Professor of Romance Languages*

William Graham Clubb, A.M., *Assistant Professor of French*

Alberto Vázquez, Ph.D., *Lecturer on Spanish American Literature*

Joseph Louis Metivier, Jr., A.B., *Instructor in Romance Languages*

Bachelor of Arts with majors in: (1) *French Literature*, (2) *Spanish American Literature*, and (3) *Spanish Literature* (*Columbia College—Faculty of Studies*)—Prerequisite: the AM and Latin requirements in the Latin College.

Required: the general requirements as stated on pages 77-83 and the study of the major examination at the end of the second year. The possession of a good knowledge upon which the student will be examined includes the political, social, and cultural background of the literature studied; the system and their works. A reasonable proficiency in the spoken language is required. Merit is required for graduate work in most institutions. The Department of Romance Languages provides a program in each of the major fields intended to assist the student in his preparation for the major examination.

Master of Arts: (1) *French Literature*, (2) *Spanish American Literature*, and (3) *Spanish Literature* (*Columbia College*)—Prerequisite: the degree of Bachelor of Arts in the appropriate field from this University, or the equivalent.

Required: the general requirements as stated on pages 84-87. The thirty hours of required work must include a thesis, for which no hours credit are allowed. The remainder of the program is arranged in consultation with the student's major adviser.

Doctor of Philosophy (*Graduate Council*)—See pages 92-93.

Bachelor of Arts in Education with teaching fields in French and in Spanish (*School of Education*)—Prerequisite: the Education Curriculum, pages 62-69.

Required: the French syllabus, pages 161 of the Syllabus, syllabus, page 163; the Professional course listed on page 164.

FRENCH

FIRST GROUP

†1-2 *First-year French* (3-3)

For beginners. Grammar, composition, oral and written exercises, translation of modern French prose. Morning and evening sections. (Also offered twice summer term.)

The Staff

French 1x, same as 1, offered spring term. Morning and evening sections.

French 2x, same as 2, offered fall term. Morning and evening sections.

†3-4 Second-year French* (3-3)

The Staff
Advanced grammar and composition, reading in modern French prose, oral practice, introductory to French civilization. Prerequisite: French 1-2 or two years of high school French. Morning, afternoon, and evening sections. (Also offered 1955 summer term.)

French 3x, same as 3, offered spring term. Morning and evening sections.

9-12 French Conversation and Composition (3-3)

The Staff
Morning and evening sections.

40 French Readings for Non-major Students (3)

Club
Designed primarily for graduate students preparing for reading examinations. Undergraduates are admitted with the permission of the instructor. No business cards for graduate students. Evening sections.

51-52 Survey of French Literature and Civilization* (3-3)

Deibel
Evening.

SECOND GROUP*

119-22 French Literature of the Sixteenth Century (3-3)

Keston
Poetry, prose, drama, and history of the French Renaissance. Readings: Montaigne, Molière, La Fontaine, etc. Class analysis of texts, oral reading. Recommended: History 120. 1945-50 and 1951-52 years. Evening.

121-22 French Literature of the Seventeenth Century (3-3)

Protnar
History, philosophy, criticism, memoirs, letters, dialogue, drama, etc. Poetry. Class analysis of texts, oral reading. 1947-48 and alternate years.

123-24 French Literature of the Eighteenth Century (3-3)

Deibel
History, philosophy, criticism, letters, dialogue, drama, etc. Poetry. Class analysis of texts, oral reading. 1949-50 and alternate years. Evening.

* French 24 is required and French 31-33 is recommended in graduate study.

- 125-26 *French Literature of the Nineteenth Century* Keating
(3-3)
Romanticism and realism; fiction, poetry, drama, criticism. Can-
nough of texts, selected readings, lectures on literature and history.
Lecture and discussion parts.
- 127-28 *French Literature of the Twentieth Century* Keating
(3-3)
Fiction, poetry, drama, criticism. Can-nough of texts, selected
readings, lectures on literature and history. Movies.
- 199-200 *Prerequisite: Reading for the Major in* PROZMAN
French Literature (3-3)
Continuation and final seminar. Time to be arranged.

THIRD GROUP

- 227-28 *Seminar in Modern French Literature* (3-3) Keating
Prerequisite: a second-year course in French literature. Lectures
and discussion parts.
- 229-30 *Seminar in Classical French Literature* (3-3) PROZMAN
Prerequisite: a second-year course in French literature. Time to be
arranged.
- 249-50 *Old French** (3-3) Davie
History and development of Old French, with an edition of an im-
portant Old French literary text. Survey of French literature to the
end of the thirteenth century. Prerequisite: a second-year course in
French literature, or elementary knowledge of Latin. Time to be
arranged.
- 251-52 *Middle French** (3-3) Davie
French literature of the fourteenth and fifteenth centuries. Can-nough
of texts, selected readings. Prerequisite: a second-year course
in French literature. Knowledge of Old French desirable. Time to be
arranged.
- 299-300 *Theatre* (3-3) The Staff

PORTUGUESE

FIRST GROUP

- 1-2 *Portuguese Prose* (3-3)
The language. Grammar, pronunciation, style of prose. Can-nough
of texts. Prerequisite: none. Not offered in 1959-60.
- 3-4 *Second Year Portuguese* (3-3)
Advanced grammar and pronunciation, reading of selected Portuguese
texts and literary discussion. Prerequisite: first year Portuguese.
Not offered in 1959-60.

tion. Prerequisite: Portuguese 1-2 or the equivalent. (Not offered in 1955-56.)

SECOND GROUP

- 127-28 *Portuguese and Brazilian Literature* (2-2)
Evolution of the Portuguese language, outline of the literature of Portugal (fall term) and Brazil (spring term). Lectures, readings, written reports. Conducted in Portuguese. Prerequisite: Portuguese 1-4 or the equivalent. (Not offered in 1955-56.)

SPANISH

FIRST GROUP

- †1-2 *First-year Spanish* (3-3) The Staff
For beginners. Grammar, composition, drill in pronunciation, translation of modern Spanish prose. Morning and evening sections. (Also offered 1955 summer term.)

Spanish 1x, same as 1, offered spring term. Morning and evening sections.

Spanish 2x, same as 2, offered fall term. Morning and evening sections.

- †3-4 *Second-year Spanish** (3-3) The Staff
Advanced grammar and composition, reading of modern Spanish prose, oral practice, introduction to Hispanic civilization. Prerequisite: Spanish 1-2 or two years of high school Spanish. Morning and evening sections. (Also offered 1955 summer term.)

Spanish 3x, same as 3, offered spring term. Morning and evening sections.

Spanish 4x, same as 4, offered fall term. Morning and evening sections.

- 9-10 *Spanish Conversation and Composition* (3-3) Alonso and Staff
Morning and evening sections.

- 51-52 *Survey of Spanish Literature and Civilization** (3-3) Supervisors
The social, literary, and cultural background of Spanish literature. Lectures, readings, and personal discussion. Prerequisite: Spanish 1-4.

SECOND GROUP*

- 121-22 *Spanish Literature of the Golden Age* (3-3) Davis
Lope de Vega, Calderon, the classic drama, the ballet, with poetry. Close analysis of these cultural products, lectures on literature and history, 1500-57 and classical years.

- †123-24 *Cervantes: the Peak of the Golden Age* (3-3) Davis
Life and works of Cervantes. The Quixote, the Novelas, the plays and other works. 1555-59 and classical years. Morning and evening sections.

* Spanish 1-4 is required and Spanish 12-24 is recommended as prerequisite in all cases except courses of Spanish.

- 125-26 *Modern Spanish Literature* (3-3) Alonso
Poetry and prose of the eighteenth and nineteenth centuries. Class analysis of texts, collateral reading, lectures on literature and history, 1956-57 and alternate years.
- 127-28 *Contemporary Spanish Literature* (3-3) Supervia
Poetry and prose of the latter part of the nineteenth and of the twentieth centuries. Class analysis of texts, collateral reading, lectures on literature and history, 1955-56 and alternate years.
- 151-52 *The Spanish American Novel* (3-3) Vázquez
Development of the novel in Spanish America. Lectures, collateral reading, and class analysis of texts. (Not offered in 1955-56.)
- 155-56 *Spanish American Literature to 1880* (3-3) Vázquez
The literature of Spanish America from the colonial period to the latter part of the nineteenth century. Lectures, collateral reading, reports, and class analysis of important works. Even years.
- 157-58 *Spanish American Literature Since 1880* (3-3) Vázquez
The literature of Spanish America from 1880 to the contemporary period. Lectures, collateral reading, reports, and class analysis of important works. 1956-57 and alternate years.
- 197-98 *Proseminar: Readings for the Major in Spanish American Literature* (3-3) Vázquez
Conferences and group discussions. Time to be arranged.
- 199-200 *Proseminar: Readings for the Major in Spanish Literature* (3-3) Alonso
Conferences and group discussions. Time to be arranged.

THIRD GROUP

- 225-26 *Seminar in Spanish Literature* (3-3) Alonso
Prerequisite: a second-semester course in Spanish literature. 1956-57 and alternate years.
- 227-28 *Seminar in Spanish American Literature* (3-3) Vázquez
Prerequisite: a second-semester course in Spanish American literature. Even years.
- †249-50 *Old Spanish** (3-3) Doyle
Literature and philology. *Primer del Cid*, *Libro de Buen Amor*, *Conde Lucanor*, etc.; *Manuel de Pádua*'s *Manual de gramática castellana* and *Fuero*. *Old Spanish Readings*. Prerequisite: a good knowledge of Spanish literature; an elementary knowledge of Latin. Time to be arranged.
- 299-300 *Thesis* (3-3) The Staff

* Only one of any language courses. French 249-50, French 251-52, and Spanish 249-50 will be given in 1955-56, depending on demand.

SECRETARIAL STUDIES

Mildred Hollander Short, A.M., *Associate Professor of Secretarial Studies, Executive Officer*

Leona Forder Dorsey, A.M., *Associate in Secretarial Studies*

Marie Mueller, A.B. in Ed., *Associate in Secretarial Studies*

Howard Lincoln Newhouse, B.S., *Associate in Secretarial Studies*

Associate in Arts (Junior College)—graduate educational institution in Secretarial Studies (For description, see page 66)

Bachelor of Arts in Education with a teaching field in Business Education (School of Education)—University of Minnesota, graduation June 1916

Requires the Secretarial Studies option, type 42, and the professional option. Graduated 1916

FIRST GROUP

1. Elementary Typewriting (3)

Short and Seal
Fundamental technique of typewriting. Basic style of business letters, instructions in abbreviating and interpretation of special abbreviations. Laboratory fee, \$5. Short and Seal
Secretarial Studies 14, same as 1, offered every term. Evening

2. Intermediate Typewriting (3)

Short and Seal
The business letter and its interpretation. Business correspondence. The letter types, when basic, correct position and work directions. The business letter. Secretarial Studies 15, or the intermediate course in the university at 12 weeks a course. Laboratory fee, \$5. Attention and

11. Elementary Shorthand and Transcription (3)

Short, Newhouse
A study of the principles of Gregg shorthand beginning with first and second transcription. Minimum shorthand speed of 40 words a minute attained. Laboratory fee, \$5. Morning and evening sessions. Secretarial Studies 16, same as 11, offered every term. Evening

12. Intermediate Shorthand and Transcription (3)

Short and Seal
Review of the principles of Gregg shorthand. Dictation and transcription on general and specialized business matters. Minimum shorthand speed of 40 words a minute attained. Penmanship. Secretarial Studies 17, or the intermediate course in the university at 12 weeks a course. Laboratory fee, \$5. Morning and evening sessions. Secretarial Studies 18, same as 12, offered every term. Evening

13. Advanced Shorthand, Typewriting, and Transcription (3)

Short and Seal
Objective and transcription, meeting problems in general business. Minimum speed of 40 words a minute attained. Penmanship

Prerequisite: Secretarial Studies 12 or the equivalent. Laboratory fee.
54. Time to be arranged.

16 *Secretarial Shorthand, Typewriting, and* Shott and Staff
Transcription (3)

Dictating and transcription involving vocalizations used in the legal and medical professions. Minimum dictation speed of 120 words a minute attained. Prerequisite: Secretarial Studies 15 or the equivalent. Laboratory fee. 84. Time to be arranged.

51 *Business Correspondence* (3)

Shott

Development of the technique of effective communication with reference to business letters and forms. Survey and analysis of current business literature. Time to be arranged.

54 *Secretarial Practice* (3)

Shott

A thorough study of mechanical problems and procedures. Practice in the use of secretarial equipment and supplies. The study of secretarial personality and office relationships. Time to be arranged.

SLAVIC LANGUAGES AND LITERATURES

Helen Zhemchuzhnaya Yakobson, B.S., *Assistant Professor of Russian*
Executive Officer

Peter Zouboff, Ph.D., *Lecturer in Russian*

- 1-2 *First-year Russian (3-3)* Yakobson and Staff
 A beginner's course in fundamentals of grammar and pronunciation with graded reading, oral drill, and written practice. Morning and evening sections. (Also offered 1955 summer term.)
- 3-4 *Second-year Russian (3-3)* Yakobson and Staff
 Systematic review of grammar. Study of special problems of Russian morphology and syntax. Oral and written reports on assigned topics. Morning and evening sections.
- 9-10 *Russian Composition (3-3)* Zouboff
 Prerequisite: Russian 1-2, 3-4, and the permission of the instructor. Evening.
- 101-2 *Rapid Readings in Russian (3-3)* Yakobson
 Readings and translations of classic and modern literary texts and critical literature. 1955-56 and alternate years. Evening.
- 103-4 *Scientific Russian (3-3)* Yakobson
 Reading and translation of technical texts. 1956-57 and alternate years.

SOCIOLOGY*

- ‡Harold Loran Geisert, Ph.D., *Professor of Sociology*
 Carr Bartleson Lavell, A.M., *Associate Professor of Sociology, Acting Executive Officer*
 Richard Walton Stephens, A.M., *Assistant Professor of Sociology*
 Henry Davidson Sheldon, Ph.D., *Lecturer in Sociology*
 Dorothy Willner, A.M., M.S.W., *Lecturer in Sociology*

Bachelor of Arts with a major in Sociology (Columbia College)—Department 121—Prerequisite: the Arts and Letters curriculum in the Junior College, see page 14 including Sociology 1-2.

Required: the general requirements as stated on pages 77-81, including Sociology 172 and 181 and equivalent hours as provided in social science studies in Sociology.

Master of Arts in the field of Sociology (Columbia College)—Prerequisite: the degree of Bachelor of Arts with a major in Sociology in this University, or the equivalent.

Required: the requirements for the degree are stated on pages 84-87. The thirty hours of required work must include a minimum of eighteen hours in third-year courses.

FIRST GROUP

1-2 *Introductory Sociology** (3-3)

The Staff

The origin and development of culture, man's social nature, types of groups and organizations, social functions, factors producing social problems, individual and social responsibility. Meeting and evening sections. (Also offered 1955-56 and 1956-57.)

Sociology 1X, 1955-56, 1956-57, offered every year. Meeting.
 Sociology 2X, 1956-57, offered fall term. Meeting.

SECOND GROUP

123 *Fields of Social Work* (3)

An introduction to the nature and scope of social work, the development of social work practice, theories of social case work, social group work and social action. 1955-57 and alternate years.

124 *Public Welfare* (3)

The organization of public welfare—federal, state, and local; the care of various groups of dependency and methods of treatment; personal, financial, and public problems. 1955-57 and alternate years.

126 *Urban Sociology* (3)

Types of cities, their growth, location, population functions, and problems; urban group life and personality; housing and city planning. 1955-56 and alternate years. Meeting.

Willner

* Sociology 1 is a prerequisite to all other courses in Sociology.
 ‡ On catalog of 1955-56.

- 127 *Community Organization* (3)
The study of social interaction in American communities, factors making for integration, community leadership, methods of securing social forces to meet community needs. 1956-57 and alternate years. Stephen
- 130 *Cultural Anthropology* (3)
Human beings, the development of social life and customs, religion, and systems of human relationships, social systems, patterns, and evolution of culture. Evening. Layel
- 131 *Social Institutions* (3)
The origin and development of social institutions, basic needs producing institutional forms, structure and functions of principal institutions and their interrelationships. 1955-56 and alternate years. Morning. Layel
- 132 *Marriage* (3)
The reasons for marriage, marriage laws, mate selection, courtship, husband-wife relations, factors in marital adjustment, marriage prediction and counseling. Morning. Layel
- 133 *The Family* (3)
A study of the primitive and modern family, changing functions and role of the family and its members, factors promoting disorganization, family stress, family reorganization. Morning. (Also offered this summer term.) Wilson
- 134 *Sociology of Child Development* (3)
The socialization of the child through the home and other social institutions, the changing status of childhood, dependent and handicapped children, child labor. 1956-57 and alternate years. Study
- 135-36 *Crime and Delinquency* (3-3)
The nature and distribution of crime, factors producing criminal behavior, police systems, the criminal and juvenile courts, the prison system, probation and parole. Evening. Study
- 141 *Population and Migration* (3)
The composition of population, theories of population growth, factors producing population movements, effects of migration, trends in population growth, population problems. 1955-56 and alternate years. Morning. Stephen
- 151 *Industrial Sociology* (3)
Interrelationships of industry and community, sociological aspects of work situation, labor movement, industrial leadership and control of the aged, ethnic, and women worker. 1956-57 and alternate years. Layel
- 151 *Social Stratification: Class and Status* (3)
The nature of the class structure, patterns of status and prestige relations in American society, and an analysis of industrial class hierarchy and comparative social structure. 1955-56 and alternate years. Layel

- 162 *Social Movements* (3) Lipsett
Major contemporary movements examined in terms of social change and creative tensions. Designed to develop conceptual frameworks and to show the way in which social movements develop. 1966-67 and alternate years. (Also offered 1974 summer term.)
- 164 *Social Control* (3) Lipsett
Internal and social planes of human control, analysis of methods of control used by society today and the situations in which that control, positive and negative, is needed. 1965-66 and alternate years. Minus.
- 172 *Contemporary Social Theory* (3) Stephens
A systematic study of the important schools of contemporary sociology, including French, European, as well as American developments, and an evaluation of the scientific contribution of each phase. Minus.
- 181 *Methods of Social Research* (1) Stephens
An attempt to reveal research techniques and the scientific method, the application of the case study, social survey, statistical, sociometric, and experimental methods to social data. Minus.

THIRD GROUP

- 223 *Seminar: Social Structure* (3)
Incorporates and social characteristics of social structure, the role of culture in determining forms of economic analysis of status by type. 1966-67 and alternate years.
- 224 *Seminar: Current Trends in Sociology* (1)
Analysis and evaluation of structural-function theory of social systems, culture, and latent functions, and an appraisal of systems theory. 1966-67 and alternate years.
- 227 *Seminar: Social Group Relations* (1) Stephens
General characteristics of social groups and their measurement, evaluation of various methods of social group theory and sociology, and techniques of social group research. 1965-66 and alternate years. Minus.
- 228 *Seminar: Mass Communication* (1) Stephens
The communication process, theories of communication, attraction and loyalty in communication in society, culture, control, groups, and analysis of mass communication. 1966-67 and alternate years. Minus.
- 235 *Research* (0.5) The Staff
This will involve an experiment. (Also offered 1967 summer term.)
- 236 *Theory* (1) The Staff
This will be required. (Also offered 1967 summer term.)

SPEECH

Lubin Poe Leggette, A.M., *Depew Professor of Speech, Executive Officer*

Calvin Weir Pettit, Ph.D., *Professor of Speech; Director of Speech Clinic*

George Francis Henigan, Jr., Ph.M., *Associate Professor of Speech*

Edwin Lockwood Stevens, A.M., *Associate Professor of Speech*

Edith Shores Surrey, A.M., *Assistant Professor of Speech*

Lee Sheward Bieliski, A.M., *Assistant Professor of Speech*

George Allan Dorsey, B.S. in E.E., *Lecturer in Speech*

Marjorie Prussing, *Associate in Speech*

Bachelor of Arts with a major in Speech (Columbia College—Departmental)—Prerequisite: the Arts and Letters curriculum in the Junior College, see page 64 including Speech 1, 2, 11, 12.

Required: the general requirements as stated on pages 77-84, including the taking of a speech proficiency test early in the program. Speech 101, 121, 131, 171, and a minimum of twelve additional hours in selected group courses in the speech area in speech courses, as approved by the adviser.

Bachelor of Arts in Education with a teaching field in Speech (School of Education)—Prerequisite: the Education curriculum, pages 1-5-10.

Required: the Speech option, pages 173-174, and the professional courses listed on page 174.

FIRST GROUP

A Speech Clinic

Individual or group sessions, without academic credit, for such work as diagnosis of defects, habit breaking, articulation, pronunciation, and general training. Fee for individual hours, \$7; for group hours, \$4. (Also offered 1955 summer term.) Pettit and Sullivan

B American Speech for Foreign Students

Individual or group instruction, without academic credit, in the pronunciation of the sounds of spoken English, with emphasis on distinctive features. The International Phonetic Alphabet is used. Fee for individual hours, \$7; for group hours, \$4. (Also offered 1955 summer term.) Bieliski and Sullivan

1 Effective Speaking (3)

Preparation and delivery of extemporaneous speeches by students on campus, study and voice control, directed and supervised by Leggette. Prerequisite: 80.10. Morning, afternoon, and evening sessions offered 1955 summer term. Leggette and Sullivan

Speech 101, listed as 1, offered spring term. Morning, afternoon, and evening sessions.

2 *Persuasive Speaking* (3)

The Staff

A continuation of Speech 1, which is prerequisite, with emphasis on speech composition and elementary principles of persuasion. Morning and evening sections.

Speech 2x, same as 2, offered fall term. Morning.

11 *Training the Speaking Voice* (3)

The Staff

Develops tone, diction, and clarity in the speaking voice. Analysis of individual voices through recordings. Phonetic approach to the study of the sounds of English, the standards of speech. Class instruction in the problems of tone, volume, pitch, and quality. Recording fee, \$3.50. Morning, afternoon, and evening sections. (Also offered 1955 winter term.)

Speech 11x, same as 11, offered spring term. Morning and evening sections.

32 *Oral Reading* (3)

The Staff

Reading to others, theory and practice in the problems of interpreting the printed page. Prerequisite: Speech 11 or the permission of the instructor. Recording fee, \$3.50. Morning and evening sections. (Also offered 1955 winter term.)

Speech 32x, same as 32, offered fall term. Morning.

SECOND GROUP

101 *Voice and Phonetics* (3)

Petit

A study of the International Phonetic Alphabet and its application to the student's own speech improvement, also personal application to such fields as theater, public speaking, speech correction, radio, and future literature. Recording fee, \$4. Evening.

102 *Oral Interpretation of Literature* (3)

Leggett

Theory and practice in the problems of communicating literature and emotion. Selections for poetry, novels, poetry and prose. Prerequisite: Speech 32 or permission of the instructor. Recording fee, \$3.50. (Not offered 1955-56.)

121 *Group Discussion and Conference Leadership* (3)

Stevens

The process of thinking and problem solving by consensus and small groups, and the methods of leading discussion and conferences. Prerequisite: one credit hour of speech or the permission of the instructor. Afternoon. (Also offered 1955 winter term.)

126 *Public Discussion and Debate* (3)

Henagan

Principles and types of public discussion and debate; practice in argumentative speaking on questions of current interest. Prerequisite: one credit hour of speech or the permission of the instructor. Afternoon.

133-34 *Radio and TV Broadcasting* (3-3)

Dancy

A study of the development of the industry, station organization and management, equipment, production techniques, practice in the preparation and production of programs. Prerequisite: permission of the instructor. Recording fee, \$5 a term. Evening.

138 *Radio and TV News Reporting* (3)

(See Journalism 138.)

- 141 *Advanced Public Speaking* (3) Henigan
A study of the structure, style, and delivery of speeches for formal occasions with special emphasis on the psychology of the audience and the occasion. Prerequisite: four credit hours of speech. Attention.
- 146 *Speech Criticism* (3) Henigan
A study of rhetorical theory with application to the criticism of important American and British oratory. Prerequisite: four credit hours of speech. (Not offered in 1955-56.)
- 153-54 *Play Production* (3-3) Leggett
A survey of the art of theater in all its aspects, providing a theoretical and technical study of drama, stage design, and general production. Includes a study of the nature of theater in history, with particular attention to the contemporary contemporary and modern drama. Laboratory fee, \$1 a term. Attention.
- 155-56 *Play Production Practice* (1-1) The Staff
Practical work in theater. Time to be arranged.
- 166 *History of the Theater* (3) Henigan
A general survey of the history of the theater, the Classical, Medieval, Renaissance, 18th and 19th century, and the Modern theater. Attention to the psychology of the instructor. Attention.
- 169 *Creative Dramatics and Children's Theater* (3) Prussner
A study of creative dramatics and its use as a teaching tool with particular emphasis on the production of children's plays. Evening Speech 1955. Time to be arranged upon term. Evening.
- 175-76 *Speech Correction* (3-3) Pettit
A study of the causes of the disorders of speech with emphasis on the normal in diagnosis and treatment of defective speech. Attention to problems of the participant. Laboratory fee, \$1 a term. Evening.
- 177-78 *Clinical Practice in Speech Therapy* (1-1) The Staff
Case work in remedial speech. This course may be repeated for a total of two credit hours. Prerequisite: Speech 195. Time to be arranged. (Also offered 1955-56.)
- 180 *Speech Pathology* (3) Pettit
An advanced study of the causes and treatment of the disorders of speech and pronunciation. Attention to the psychology of the participant. Evening.
- 182 *Introduction to Hearing Problems* (3) Pettit
A study of the field of audiology including anatomy of the ear, the hearing process, and hearing training. Attention to the psychology of the participant. Laboratory fee, \$1 a term. Evening.
- 183-84 *Clinical Practice in Hearing Therapy* (1-1) The Staff
Case work with hearing-impaired with hearing aids. Prerequisite: Speech 182. Time to be arranged. (Also offered 1955-56.)
- 191-92 *Prerequisite: Speech & Grammar* (3-3) The Staff
Reading.

STATISTICS

Frank Mark Weida, Ph.D., *Professor of Statistics, Executive Officer*
 Everett Herschel Johnson, Ph.D., *Professor of Statistics*
 Isidor Heller, Ph.D., *Professional Lecturer in Statistics*
 _____, *Associate Professor of Statistics*
 Solomon Kullback, Ph.D., *Lecturer in Statistics*
 Chester Hayden McCall, Jr., A.M., *Instructor in Statistics*

Bachelor of Arts or Bachelor of Science with a major in Mathematical Statistics (Columbia College—Field of Study)—Prerequisite: the Arts and Letters or the Science curriculum, respectively. In the former College, see pages 94 and 95. Prerequisites include Mathematics 12, 13, and 20; Statistics 91-92; and Philosophy 121 and 122.

Required: one course, commencing with pages 77-81, including Statistics 117, 118, 155-56, 157-58, and 159-60; a minimum of twenty-four credit hours of approved courses in departments in the Division of Mathematics and the Physical Sciences or in departments in the Division of the Natural Sciences or in departments related to Statistics; and the grade of "pass" on the major examination at the end of the senior year. For further details, consult the syllabus.

Master of Arts or Master of Science in the field of Mathematical Statistics (Columbia College)—Prerequisite: a Bachelor of Arts or Bachelor of Science degree, respectively, with a major in Statistics at this University or the equivalent.

Required: the general requirements as stated on pages 84-87. The student must make four or more hours in statistics, including at least twelve credit hours to be secured from approved two-semester courses in Statistics. The remaining twelve or so hours may be secured from graduate work offered by departments in the Division of Mathematics and the Physical Sciences or by departments in the Division of the Natural Sciences with the approval of the adviser.

Doctor of Philosophy (Graduate Council)—See page 91.

Bachelor of Science in Engineering with an option in Statistics (School of Engineering)—For institutional requirements, see pages 131-33, 136-37 and 138.

Bachelor of Arts in Government and Master of Arts in Government with major in Business and Economic Statistics (School of Government)—See pages 179-80, 182-83, 184-86, 187.

FIRST GROUP

51 *Introduction to Business and Economic Statistics* (3)

The Staff

Survey of elementary principles and procedures for collecting, analyzing, and interpreting statistical data; consideration of characteristic types, measures of variability, sampling, probability, index numbers, time series analysis, and simple correlation. Prerequisite: one entrance test in Algebra. Laboratory fee, \$8. Lecture (2 hours)—morning and evening sessions; laboratory (2 hours)—afternoon and evening sessions. (Also offered 1955 summer term.)

Statistics 51a, same as 51, offered spring term. Evening

52 *Mathematics of Finance* (3)

The Staff

Interest and discount, annuities, valuation of stocks and bonds, sinking funds, amortization, valuation of depletable assets, depreciation, leasing and tax considerations. Prerequisite: one course with calculus. Morning, afternoon, and evening sections. (Also offered next summer term.)

Statistics 52X, held on 52, offered fall term. Morning and evening sections.

53 *Introduction to Statistics in Psychology and Education* (3)

The Staff

Source of data, tabulation, graphs and charts, measures of central tendency and variability, rate ratios and derived ratios, correlation, and their use, frequency distributions, contingency and other measures, reliability and validity of tests, normal curve, sampling, sampling methods, statistical error, limitations of statistics. Prerequisite: no previous work in statistics. Laboratory fee, \$8. Lecture 12 sessions, morning and evening sections, laboratory (2 hours) continuous and evening sections.

Statistics 53X, same as 53, offered spring term. Evening.

†91-92 *Principles of Statistical Methods** (3-3)

McCall

The course emphasizes the treatment, use, and applications of, sampling and distribution, measurement and measurement, averages and measures, frequency distributions and their characteristics, effect of sample size, random distributions and their characteristics, effect of sample size, and their control, beta function, trends, errors, errors, errors, errors, and random errors, in theory, practice, and application. Prerequisite: one semester work in statistics. Laboratory fee, \$8. Lecture 12 hours, laboratory (2 hours), laboratory (2 hours). Evening.

SECOND GROUP

105X *Statistics in Psychology and Education* (3)

McCall

Advanced study of correlation and frequency analysis, sampling theory, factor analysis, and applications to specific problems within the field of study in which it is feasible. Original work is required of each student. Prerequisite: Statistics 53. Laboratory fee, \$8. Lecture 12 hours, laboratory (2 hours). Morning.

109 *Managerial Statistics* (3)

Johnson

Role of statistics and the contribution of statistical procedures to various phases of business management with emphasis on the need for and application of the statistical method rather than the mechanics of statistics. Subject matter consists of sources and methods for obtaining data, selection of sampling methods, estimation of parameters, and analysis of quantitative and qualitative data, correlation, regression, and analysis of variance, etc. Prerequisite: one semester of calculus or knowledge of Algebra. (Not offered in 1955-56.)

* Statistics 91-92 is for Statistical majors for students in engineering and in the biological and physical sciences.

- 110 *Quality Control Techniques* (3) Johnson
Characteristics, scientific basis; reduction in cost of inspection, rejection, and rework; using quality as an attribute; distribution of quality characteristics; laws basic to control; statistical and maximum possible detection of lack of control. Admission by permission of the instructor or following Statistics 51. (Not offered in 1955-56.)
- 111 *Business and Economic Statistics I* (3) Johnson
Statistical processes as related to particular types of problems encountered in business administration and economic research. Subject matter includes elementary value measures of variability, sampling variation, sampling distributions and simple correlation. Admission by permission of the instructor. Missing and evening sections. (Also offered 1955 summer term.)
- 112 *Business and Economic Statistics II* (3) Johnson
Application of statistical methods to specific problems of business administration and economics. Subject matter includes multiple and partial correlation, time series analysis, index numbers, business cycle, demand functions, and departmental planning. Prerequisite: Statistics 111 or the equivalent. Missing and evening sections. (Also offered 1955 summer term.)
- 117 *Analysis of Variance* (3) McCall
The analysis of variance and covariance is presented (factors producing significant variation, a method to measure experimental error, multiple comparisons with general trade hypothesis). Prerequisite: Statistics 91-92. Evening. (Also offered 1955 summer term.)
- 118 *Correlation and the Chi-Square Test* (3) McCall
Abstract study of simple, partial, and multiple correlation. Rank correlation, the method of moments, and the problem of normal and non-normal correlations. Tests of independence, fitness, and goodness of fit. Prerequisite: Statistics 91-92. Evening. (Also offered 1955 summer term.)
- 4155-56 *Mathematical Probability* (5-3) Weida
Distribution, comparison of basic, total and compound probability; normal distribution; Bayes' theorem and paradoxes; Bernoulli's theorem and its experimental verification; mathematical expectation; law of large numbers and its application. Prerequisite: Mathematics 20 and Statistics 91-92. Evening.
- 4157-58 *Mathematical Statistics* (3-3) Weida
Statistics as a system, types of problems, relative frequency and probability, binomial and multinomial distributions, Pearson system of curves, Gauss-Charlier series, Cauchy distribution, application for regression method, Law of dispersion, generating functions, simple linear theory, moments and non-moments. Prerequisite or co-requisite: Statistics 111-12. Evening.
- 195-56 *Reading and Research in Business and Economic Statistics* (3-3) Johnson
Admission by permission of the instructor. Time to be arranged.

†197-98 *Statistical Mathematics** (3-3)

Weida

Matrix algebra, quadratic forms, double integration, measure theory, Stieltjes integration, Cauchy theory of residues, to the integral theory in flat spaces. Prerequisite: Mathematics 139 or the equivalent. Evening.

199-200 *Prerequinar: Theoretical and Applied Statistics* (3-3)

Weida

In addition to the study of recent advances in statistical methods, this course is designed to provide the content of the baccalaureate course. Admission by permission of the instructor. There is no fee.

THIRD GROUP*

201 *Design of Experiments* (3)

Weida

Random results of random, repeated, grouped, and double sampling. Fisher-Pitman method of two-dimensional, randomized blocks, Latin square, factorial design, confounding, partial confounding. (Not offered in 1953-54.)

202 *Theory of Estimation and Testing Hypotheses* (3)

Weida

Statistical estimation, maximum likelihood estimates, Markoff inequality, Neyman-Pearson theory of testing hypotheses, Bayes rule, consistency, efficiency, and sufficient statistics, theory of confidence intervals. (Not offered in 1953-54.)

223-4 *The Theory of Econometrics* (3-3)

Johnson

Statistical methods applied to the analysis of production, supply, and demand, supply and demand, interest and taxation theories, social equilibrium, and the determination of income, in terms of production, consumption, and government of such income. Admission by permission of the instructor. (Not offered in 1953-54.)

205-6 *Advanced Business and Economic Statistics* (3-3)

Johnson

Application of statistical methods to growth problems, statistical methods in business and economics. Emphasis is placed on the use of statistical methods, estimation of growth, interpretation of regression, and analysis. Original work is required of each student. Prerequisite: Statistics 112 or the equivalent. (Not offered in 1953-54.)

227-28 *Advanced Mathematical Statistics* (3-3)

Mathematical basis of statistics, functional measures, and probability, probability and likelihood, normal distribution, central limit theorem, Chebyshev inequality, asymptotic and exact confidence intervals, maximum likelihood estimates, analysis of variance, analysis of covariance.

* Prerequisite for a graduate course in statistics.

- †250-60 *Advanced Mathematical Probability* (3-3) Kullback
 Modern theories and asymptotic theory, elementary theory of infinite
 generating functions, theory of probability, the contributions of Cauchy,
 Fourier, Laplace, and Gauss. Prerequisite: Statistics 257-58 or
 the equivalent. (Not offered in 1955-56.)
- †263-64 *Statistical Inference* (3-3) Weida
 Sample mean, methods for estimating population parameters, interval
 estimation, and its application to testing hypothesis, valid, efficient,
 and exact estimation, Student's distribution, variance distribution,
 binomial distribution, t , F , moments and cumulants used as estimates of
 population parameters and used to test hypothesis. Prerequisite or
 equivalent permission. Statistics 257-58 or the equivalent. (Not
 offered in 1955-56.)
- †265-66 *Multiple Analysis* (3-3) Weida
 Tests of significance, generalized variance and covariance, tests of
 independence, canonical and some correlation coefficients, normal
 distribution, generalized Student's t -ratio, problems of estimation, ge-
 neralized factor analysis. (Not offered in 1955-56.)
- †267-68 *Characteristic Functions* (3-3)
 Fourier integrals, the characteristic function, Fourier series, moments,
 applications to the distribution problem in statistics. Prerequisite:
 Statistics 257-58.
- †269-70 *Sequential Testing* (3-3) Kullback
 Examples of sequential tests, sequential probability ratio test, con-
 tinued sampling of observations necessary for a decision, truncated
 sequential analysis, sequential tests of slope and variance hypothesis.
 (Not offered in 1955-56.)
- 275-96 *Reading and Research* (3-3) Weida
 Assigned by permission of the instructor. Time to be announced.
- 299-300 *Thesis* (3-3) Weida

COURSES OFFERED IN SPECIAL PROGRAMS

In addition to the regular courses announced above the University offers the following courses especially for students enrolled in the following special programs: Navy Graduate Comptrollership Program, Air Force Advanced Management Program, Military Economics and Politics Program, and Engineering Administration.

120 *Principles of Statistical Analysis* (5)

227 *Operations Analysis* (1)

SURGERY

- Brian Blades, A.B., M.D., *Professor of Surgery, Executive Officer*
 Paul Stirling Putzki, M.D., *Clinical Professor of Surgery*
 Arch Lockhart Riddick, B.S., M.D., *Clinical Professor of Surgery*
 John Hugh Lyons, M.D., M.S., *Clinical Professor of Surgery*
 John Gordon Lee, A.B., M.D., C.M., Med. Sc.D., *Adjunct Clinical Professor of Surgery*
 Robert Tuthill Gants, B.S., M.D., *Adjunct Clinical Professor of Surgery*
 Herbert Hermann Schoentfeld, M.D., *Associate Clinical Professor of Surgery*
 Alec Horwitz, M.S., M.D., *Associate Clinical Professor of Surgery*
 William Stanley McCune, A.B., M.D., *Associate Clinical Professor of Surgery*
 Walter Henry Gerwig, Jr., A.B., M.D., *Associate Clinical Professor of Surgery*
 Vincent Michael Iovine, B.S., M.D., *Associate Clinical Professor of Surgery*
 Owen Gwathmey, A.B., M.D., *Assistant Professor of Surgery*
 Benjamin Franklin Dean, Jr., M.S., M.D., *Assistant Clinical Professor of Surgery*
 Carl Berg, M.D., *Assistant Clinical Professor of Orthopedic Surgery*
 Calvin Trexler Klopp, A.B., M.D., *Assistant Clinical Professor of Surgery*
 Julius Salem Neviasser, A.B., M.D., *Assistant Clinical Professor of Orthopedic Surgery*
 Jerome Blaine Hatrell, M.D., *Assistant Clinical Professor of Surgery*
 Leonard Theodore Peterson, B.S., M.D., *Assistant Clinical Professor of Orthopedic Surgery*
 John Petch Adams, B.S., M.D., *Assistant Clinical Professor of Orthopedic Surgery*
 Gordon Sparks Lettermann, B.S., M.D., *Assistant Clinical Professor of Surgery*
 Richard Knight Thompson, D.D.S., *Associate in Dental Surgery*
 William Ross Morris, M.D., *Associate in Surgery*
 Jacob Joseph Weinstein, B.S., Phar.G., M.D., *Associate in Surgery*
 William Carey Meloy, M.D., M.S. in Med., *Associate in Surgery*
 Edward Alexander Cofritz, M.D., *Associate in Surgery*
 Karl Hayden Wood, Phar.G., D.D.S., *Associate in Dental Surgery*
 Isabella Harrison, A.B., M.D., *Associate in Surgery*
 Henry Leon Feller, A.B., M.D., *Associate in Orthopedic Surgery*
 Howard Clemeth Pierpont, A.B., M.D., *Associate in Surgery*

- James Richard Thistlethwaite, B.S., M.D., *Associate in Surgery*
 Paul Charles Adkins, A.B., M.D., *Instructor in Surgery*
 Crenshaw Douglas Briggs, B.S., M.D., *Clinical Instructor in Surgery*
 Joseph Francis Conlon, D.D.S., *Clinical Instructor in Dental Surgery*
 Duane Case Richtmeyer, A.B., M.D., *Clinical Instructor in Surgery*
 Leon Gerber, M.D., *Clinical Instructor in Surgery*
 Thomas Bradley, A.B., M.D., *Clinical Instructor in Surgery*
 Ernest Alva Gould, B.S., M.D., *Clinical Instructor in Surgery*
 Austin Bertram Rohrbaugh, Jr., M.D., *Clinical Instructor in Orthopedic Surgery*
 Marvin Hayne Kendrick, A.B., M.D., *Clinical Instructor in Surgery*
 Brooks Gideon Brown, B.S., M.D., *Clinical Instructor in Surgery*
 Lois Irene Platt, A.B., M.D., *Clinical Instructor in Surgery (Cancer Cytology)*
 John DeCator Hoyle, B.S., M.D., *Clinical Instructor in Surgery*
 Robert Roland Smith, B.S., M.D., *Clinical Instructor in Surgery*
 Norman Harry Isaacson, A.B., M.D., *Clinical Instructor in Surgery*
 Charles Stanley White, Jr., B.S., M.D., *Clinical Instructor in Surgery*
 Dennis Parfremment McCarty, M.D., *Clinical Instructor in Surgery*
 Theodore Crandall Alford, A.B., M.D., *Clinical Instructor in Surgery*
- 101-2 *Surgical Anatomy* Surgery and Anatomy Staffs
 Course illustrating relationship between gross anatomy and clinical surgery. One hour every two weeks. University Hospital.
- 280 *Introduction to Surgery* The Staff
 Lectures and demonstrations covering the field of general surgery. One hour twice a week.
- 284 *Surgical Physiology* The Staff
 A clinical and laboratory course with particular emphasis on applied physiology. Two hours a week.
- 373-74 *Clinical Clerkship I* The Staff
 The student is assigned and required to work up thoroughly the cases for diagnosis and treatment. D. C. General Hospital.
- 375-76 *Outpatient Surgical Clinic* The Staff
 Surgical cases. Forty hours. D. C. General Hospital.
- 377-78 *Orthopedics I* The Staff
 Work in orthopedic branch, D. C. General Hospital, weekly seven and one-half hour ward rounds. D. C. General Hospital.
- 379-80 *Surgical Staff Conference I* The Staff
 Tuesday at D. C. General Hospital.
- 383-84 *Surgical Clinic I* Blades
 Demonstration of various surgical diseases to the entire class. One hour a week.

- 473-74 *Clinical Clerkship II* The Staff
Six weeks, University Hospital, three weeks, Mt. Airy Hospital
- 479-80 *Surgical Staff Conference II* The Staff
Wednesday at the University Hospital
- 483-84 *Surgical Ward Rounds* Blades
Demonstration of various surgical diseases to fourth year students. One hour a week. University Hospital.
- 491-92 *Surgical Pathology II* Newman
One hour a week in each week
- 493-94 *Surgical Anatomy* Horwitz and Staff
Lectures for Assistant Surgeons. One hour a week for twelve weeks. University Hospital
- 497-98 *Surgical Clinic* Goss and Staff
Continuation for fourth year students assigned to the University Hospital. Two hours a week. Wilkes Road Hospital

UROLOGY

Frederick A. Reuter, M.D., *Professor of Urology, Executive Officer*
 Thomas Carlton Thompson, B.S., M.D., *Clinical Professor of Urology*
 Edward Egner Ferguson, M.D., *Assistant Clinical Professor of Urology*
 Leon Richard Culbertson, B.S., M.D., *Assistant Clinical Professor of Urology*

Gilbert Ottenberg, A.M., M.D., *Associate in Urology*
 William Dabney Jarman, B.S., M.D., *Associate in Urology*
 Gordon Rhodes MacDonald, B.S., M.D., *Clinical Instructor in Urology*
 Herbert DeGrange Wolff, Jr., M.D., *Clinical Instructor in Urology*
 Frederick Turner Reuter, M.D., *Clinical Instructor in Urology*
 Hamilton Peacock Darnon, B.S., M.D., *Clinical Instructor in Urology*

395-96 *Clinics* The Staff
 Clinical teaching and demonstrations on the care of urological cases
 with special emphasis on the care and management of carcinoma
 of the bladder and kidney. D. C. General Hospital.

491-92 *Urology* F. A. Reuter and Staff
 Lectures covering the entire field of urology including diseases of the
 kidney and bladder, prostatic disease. One hour a week.

495-96 *Clinics* F. A. Reuter and Staff
 Clinical demonstrations, teaching in the Outpatient Department, and
 university. X-ray examinations with special attention given to diagnosis
 of carcinoma. One part of each section three times a week. University
 Hospital.

ZOOLOGY*

Ira Bowers Hansen, Ph.D., *Professor of Zoology, Executive Officer*
 Kenneth Casper Kates, Ph.D., *Professional Lecturer in Zoology*
 Edith Elizabeth Mortensen, Ph.D., *Associate Professor of Zoology*
 Alton Harold Desmond, Ph.D., *Assistant Professor of Zoology*

Bachelor of Arts or Bachelor of Science (Columbia College—Field of Study)—Prerequisite: the Arts and Letters or the Science curriculum, respectively, in the Junior College, any pages 64-65, including Zoology 1-2.

Requirements: the general requirements as stated on pages 77-81, and the grade "C" on the Zoology major examination at the end of the senior year. The student should know the topics which the student will be examined in, including the following fields: (1) classification, structure, and ecological relations of animals, both invertebrate and vertebrate; (2) embryological development and the topics of important animal types; (3) general principles of physiology, heredity, and evolution; (4) the development of biological principles, hypotheses, and theories as revealed in the study of the history of zoology.

Master of Arts or Master of Science in the field of Zoology (Columbia College)—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in Zoology at this University, or the equivalent.

Requirements: the general requirements as stated on pages 84-87.

Degree in Philosophy (Graduate Council)—See page 94.

FIRST GROUP

1-2 Introduction to Zoology (4-4)

At introduction to the study of the structure, functions, and habits of animals, and of the fundamental biological principles. Manual by: 810 & 810. Lecture (2 hours)—Mortensen, and evening laboratory (4 hours)—Mortensen, Desmond, and evening section. (Also offered 1955 winter term.)

41-42 Comparative Vertebrate Anatomy (3-3)

Lectures on the major systems of the vertebrates, laboratory dissections of types. Prerequisite: Zoology 2. Manual by: 810 & 810. Lecture (1 hour)—Mortensen, and evening section. Laboratory (4 hours)—Mortensen, Desmond, and evening section.

SECOND GROUP

101-2 Invertebrate Zoology (3-3)

A systematic study of invertebrate forms, including the study of morphology, classification, life history, and physiological structure. Manual by: 810 & 810. Lecture (1 hour)—Mortensen, and evening section. Laboratory (4 hours)—Mortensen, Desmond, and evening section. (Also offered 1955 winter term.)

* See also the departments of Botany and Biology.

- 105 *Entomology* (3) Munson
A study of the elementary morphology, physiology, and ecology of insects, with an introduction to the taxonomy of the more important groups. Prerequisite: Zoology 1-2, or the equivalent. Material fee, \$7. Lecture (1 hour); laboratory (4 hours). 1956-57 and alternate years.
- 138 *Histology* (3) Desmond
An introduction to the microscopical anatomy of normal tissues and organs. Prerequisite: Zoology 1-2. Material fee, \$1. Lecture (1 hour); laboratory (4 hours). 1955-56 and alternate years, evening; 1956-57 and alternate years, afternoon.
- 145 *Introduction to Vertebrate Embryology* (3) Hansen
The origin and early development of the individual and the formation of organ systems. Emphasis is placed on the frog, chick, and pig, with reference to the human embryo. Prerequisite: Zoology 2 or the equivalent. Material fee, \$1. Lecture (1 hour); laboratory (4 hours). 1955-56 and alternate years, evening; 1956-57 and alternate years, afternoon. (Also offered 1955 summer term.)
- 152 *Protozoa* (3) Mortensen
An introduction to the protozoa: classification, life histories, and physiology, with special emphasis on free-living types. Prerequisite: Zoology 1. Material fee, \$7. Lecture (1 hour); laboratory (4 hours). (Not offered in 1955-56.)
- 156 *Parasitology* (3) Kates
An introduction to the study of animal parasitology, with a survey of parasitic types from protozoa through arthropods. Prerequisite: Zoology 1-2 or the equivalent. Material fee, \$12. Evening.
- 162 *Insect Physiology* (3) Munson
Lectures and laboratory work on the physiology of insects. A minimum fee paid to the instructor. Material fee, \$10. 1956-57 and alternate years.
- 171-72 *Special Problems* (3-3) The Staff
Written approval of the instructor is required. Material fee, \$10 a term. Time to be arranged.
- 199-200 *Proseminar* (3-3) The Staff
A course designed to correlate and supplement the work of Zoology majors. Morning and evening sections.
- THIRD GROUP
- 203 *Seminar in Invertebrate Zoology* (3) Mortensen
A study of original publications on hormones of invertebrate animals. Evening.
- 214 *Advanced Invertebrate Zoology* (3) Mortensen
Lectures and laboratory work on problems in invertebrate physiology. Prerequisite: Zoology 1 and 101-2 or the equivalent. Material fee, \$7. Lecture (2 hours); laboratory (2 hours). Evening.

- 247-48 *Morphogenesis* (3-3)
Lectures and class reports on experimental morphology. Prerequisite: Zoology 41-42, or the equivalent. 1950-57 and alternate years. Evening. Hansen
- 251 *Seminar in Vertebrate Zoology* (3)
Evening. Desmond
- 295-96 *Research* (arr.)
Investigation of special problems. Time and credits to be arranged. (Also offered 1955 summer term—Zoology 295 (3-3). The Staff
- 299-300 *Thesis* (3-3)
Time to be arranged. (Also offered 1955 summer term—Zoology 299 (3-3). The Staff

STUDENT LIFE

STUDENT LIFE

HEALTH ADMINISTRATION

The University maintains a health service that is primarily diagnostic in its intent. For medical emergencies and health consultations there is, on the Campus, a Student Health Clinic open from 9:00 A.M. to 5:00 P.M., with physician and nurse in attendance. There is also a rest room for women, with a graduate nurse in charge.

Medical privileges include: (1) the physical examination of every student entering from secondary school; (2) three visits by the University physician or surgeon, office or residence (District of Columbia), in any one illness, exclusive of a specialist, surgical operation, laboratory, or X-ray examination; (3) hospitalization in the University Hospital for not more than one week during any twelve-month period.

Hospitalization includes board and nursing but does not include special services such as operating room, anesthesia, laboratory, X-ray, or medications. For a statement of the rules governing medical and hospital privileges, see Health Administration, pages 205-6.

LIVING ACCOMMODATIONS

Women Students.—The Hattie M. Strong Residence Hall provides single rooms at \$15 a month and double rooms at \$30 a month a person. Meals are served at the Student Union. Admission to the University does not include dormitory reservation. A separate application for a room should be made well in advance (for the fall term by May first, for the spring term by January first). Forms for application, together with detailed information, may be obtained from the Director of Activities for Women.

Girls under the age of twenty-one who are enrolled for twelve or more credit hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory, except with persons approved by the Director of Activities for Women.

Men Students.—Welling Hall provides double room facilities for 102 students. Rooms rent for \$24 a month a person. Dining facilities are available to all residents. Meals are served at the Student Union. Application forms for reservations may be obtained from the Director of Activities for Men.

Information concerning private rooming and boarding facilities near

the University for women students twenty one years of age or older and for men students may be obtained at the Housing Office, Lisner Auditorium, 730 Twenty-First Street, NW. The reservation of rooms in private houses must be made by students.

RELIGIOUS LIFE

The University recognizes the contribution that religion can make to the education of its students by encouraging them to participate in denominational clubs of their own choice. National Catholic, Jewish, and Protestant bodies sponsor these religious organizations, which act as links between the University and the local churches. The Director of the University Chapel and the advisers to the various denominational organizations are available throughout the year for consultation on personal problems.

UNIVERSITY CHAPEL

The University Chapel is maintained as a non-sectarian expression of the faith of the University in the contribution that religion can make to the education of its students. Twenty-minute services are held Wednesday of each week at 12:10 P.M. Representative clergymen of Washington are guest speakers at these non-denominational services.

STUDENT PLACEMENT OFFICE

The Student Placement Office, 2114 G Street NW., provides assistance to students and alumni seeking full- and part-time employment. This office maintains a registry of positions locally and nationally available and refers qualified applicants for consideration. Information is also available on Civil Service examinations.

VOCATIONAL COUNSELLING

The University Testing Center is located at 2114 G Street NW. The Center offers educational and vocational testing and counseling services. This office maintains a file of occupational information and training opportunities.

STUDENT UNION

The Student Union, 4125 G Street NW., is the center for student life. From the cafeteria on the first floor to the game room on the fourth floor, it is well planned to meet the students' need for meals, study, recreation, and activities. In addition to the recreation lounge and social lounge the Student Union provides office space for the Student Council and for the other major student organizations.

The Student Activities Office, also in the Student Union, has available information concerning the student organizations and campus events.

INTERNATIONAL HOUSE

The International House, 2110 G Street NW., is the social center for students from foreign countries. A series of teas, dances, and other forms of entertainment, and the use of club rooms and lounge enable students to become acquainted and feel at home in the University.

The International Students' Society welcomes as members students from other lands as well as North American students.

The Adviser to Students from Foreign Countries, whose office is in International House, is available for advice and guidance.

STUDENT ACTIVITIES

DIRECTORS OF STUDENT ACTIVITIES

The University maintains the offices of the Director of Activities for Men and the Director of Activities for Women, for the guidance of students in all nonacademic phases of student life, such as student activities, social life, and housing. The directors are available for individual counseling concerning personal adjustment to university life.

STUDENT GOVERNMENT

Student Council

The Student Council is responsible to the Director of Activities for Men and the Director of Activities for Women for the conduct of all student activities. Members of the Council are elected annually.

Committee on Student Life

The Committee on Student Life is the judicial branch of the student government. It is composed of not more than seven members of the faculty, two of whom are the Director of Activities for Men and the Director of Activities for Women, appointed by the President of the University, and the following members: President of the Student Council, an Editor of the *Hatchet*, President of the Mortar Board, President of Omicron Delta Kappa, President of the Inter-Fraternity Council, and President of Panhellenic Council. This Committee has the power to review the acts of all student organizations, including the Student Council, and set aside acts that are contrary to established policy and regulations of the University or the Committee.

Approval of Student Organizations. This committee is granted authority to approve or disapprove the establishment of any proposed organization on campus. No student club or society (except social fraternities, sororities, scholastic honor societies, religious or professional clubs or societies) organized as a branch or affiliate of a non-George Washing-

ton University organization will be recognized by the Committee on Student Life.

ELIGIBILITY FOR STUDENT ACTIVITIES

Any student registered in The George Washington University is eligible to participate in nonathletic student activities of the University; however, a student having a scholastic average of less than 2.00 is not eligible to be:

- 1 A member of the Dance Production groups, Glee Club, Cheerleaders, Student Council, Religious Council, Panhellenic Council, Inter-Fraternity Council, Student Life Committee, or any publications staff.
- 2 An officer, permanent committee chairman, or member of the executive board of any activity.

The rules and policies of the Southern Conference govern participation in intercollegiate athletics.

The control and administration of all student activities are outlined in a separate bulletin called "Rules and Regulations Governing Student Activities".

STUDENT ORGANIZATIONS

HONOR SOCIETIES

Phi Beta Kappa.—A national honor society recognizing "outstanding intellectual capacity well employed" in the field of liberal arts and sciences. Senior and junior students who are candidates for the degree of Bachelor of Arts or Bachelor of Science in Columbian College (in exceptional cases, senior and junior students in other non-professional divisions of the University) and who have shown broad cultural interests, distinguished scholarly achievement, high character, general promise, and scholarly ideals may, to a number not exceeding 15 per cent of a class, be elected to membership by the Faculty members of the Alpha Chapter of the District of Columbia.

Sigma Xi.—A national scientific honor society, the purpose of which is to encourage original investigation in science pure and applied. Outstanding graduate students in the sciences are eligible for full membership, and undergraduates who have shown marked ability in research may be elected to associate membership.

Alpha Kappa Delta.—A national sociology society.

Alpha Lambda Delta.—A national fraternity established to encourage and reward high scholarship and attainment, membership in which is limited to those freshman women who attain a scholastic average of at least 3.50.

- Alpha Pi Epsilon*.—A home economics fraternity.
- Arnold Air Society*.—A national Air Force ROTC society.
- Artus*.—A national economic society.
- Delphi*.—An intersorority society.
- Delta Sigma Rho*.—A national forensic society.
- Gate and Key*.—An interfraternity society.
- Iota Sigma Pi*.—A national chemical society for women.
- Mortar Board*.—A national society for senior college women stressing leadership, scholarship, and service.
- Omicron Delta Kappa*.—A national fraternity emphasizing leadership in extracurricular activities.
- Order of the Coat*.—A national legal society, the purpose of which is to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship. Members are elected each year from the highest 10 per cent of the graduating class of the Law School.
- Phi Epsilon Phi*.—A national botany fraternity.
- Phi Eta Sigma*.—A national fraternity, established to encourage and reward high scholarship and attainment, membership in which is limited to those freshman men who attain a scholastic average of at least 3.50.
- Pi Delta Epsilon*.—A national collegiate journalism fraternity.
- Pi Gamma Mu*.—A national social-science society.
- Pi Chi*.—A national psychology fraternity.
- Rho Chi Society*.—A national pharmaceutical society.
- Sigma Alpha Eta*.—A national speech and hearing society.
- Sigma Pi Sigma*.—A national physics fraternity.
- Sigma Tau*.—A national engineering fraternity, the purpose of which is to recognize scholarship and professional attainment.
- South-Ross-Russell Society*.—A scholastic society in the School of Medicine. Students of the third and fourth years who maintain a scholastic average of 80 per cent are eligible for associate membership.
- Tauets*.—A sophomore society.
- William Beaumont Medical Society*.—A society founded with the object of encouraging and stimulating medical students in work of individual investigation.

PROFESSIONAL ORGANIZATIONS

Alpha Chi Sigma (chemistry), Alpha Epsilon Iota (medicine), Alpha Kappa Psi (commerce and economics), Alpha Zeta Omega (photography), American Institute of Electrical Engineers (student chapter), American Institute of Radio Engineers (student chapter), American Pharmaceutical Association (student branch), American Society of Civil Engineers (student chapter), American Society of Mechanical Engineers (student chapter), Chi Upsilon (geology), Delta Phi Epsilon (foreign service),

Delta Theta Phi (law), Future Teachers of America, Gamma Eta Gamma (law), Kappa Beta Pi (law), Kappa Psi (pharmacy), Nu Beta Epsilon (law), Nu Sigma Nu (medicine), Phi Alpha Delta (law), Phi Chi (medicine), Phi Delta Delta (law), Phi Delta Epsilon (medicine), Phi Delta Gamma (graduate), Phi Delta Kappa (education), Phi Delta Phi (law), Pi Lambda Theta (education), Society for the Advancement of Management (student chapter), Theta Tau (engineering).

SOCIAL FRATERNITIES

Sigma Chi, Kappa Sigma, Theta Delta Chi, Phi Sigma Kappa, Sigma Alpha Epsilon, Sigma Phi Epsilon, Phi Alpha, Sigma Nu, Alpha Tau Kappa Epsilon, Pi Kappa Alpha, Tau Epsilon Phi, Alpha Epsilon Phi, Delta Tau Delta.

SOCIAL SORORITIES

Pi Beta Phi, Chi Omega, Sigma Kappa, Alpha Delta Pi, Delta Zeta, Kappa Delta, Phi Sigma Sigma, Zeta Tau Alpha, Kappa Kappa Gamma, Delta Gamma, Kappa Alpha Theta.

DEPARTMENTAL CLUBS

Art Club, Case Club, Chemistry Club, Dance Production Group, I. H. III, El Club Español, Engineers' Council, Russian Debating Society, Home Economics Club, Howard E. Kane—A.F.A. King Orlin Club, Le Cercle Français, Lester E. Ward Sociological Society, Opuscula, Pharmacy Council, Phi Sigma Rho (philosophy), Psychology Club, Schoenfeld Verein, Student Bar Association, Charles Clinton Smith History Club.

RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai B'rith Hillel Foundation, Canterbury Club, Christian Science Organization, Lutheran Student Association, Newman Club, Religious Council, Student Christian Fellowship, Wesley Club, Westminster Foundation.

MUSICAL ORGANIZATION

The George Washington University Glee Club.

STUDENT PUBLICATIONS

Amicus Curiae (Law School publication), *The Cherry Tree* (the annual), *The University Hatchet* (weekly newspaper), *The George Washington Law Review*, *Metaphysics* (philosophy publication), *The Periodic* (pharmaceutical publication).

OTHER ACTIVITIES

Alpha Phi Omega—National Service Fraternity, Alpha Theta Nu (scholarship winners), Big Sisters, Cheerleaders, Chess Club, Colonial Boosters, Fencing Club, Flying Sponsors, Interfraternity Council, Interfraternity Pledge Council, International Relations Club, International Students' Society, Intersorority Athletic Board, Intramural Council, Junior Panhellenic Association, Masonic Club, Sailing Association, Senior Panhellenic Association, Strong Hall Council, Student Council, The George Washington University Dramatic Activities, Women's Coordinating Board, Women's Recreation Association.

There is a complete program of intramural sports for both men and women.

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THE UNIVERSITY RECORD

SUMMER TERM 1954

FALL AND SPRING TERMS 1954-55

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JUNIOR COLLEGE

ASSOCIATE IN ARTS

NOVEMBER 11, 1954

[illegible]

FEBRUARY 22, 1955

V ₁	John F. Kennedy Library	V ₆
D.C.	Strategic Arms Limitation	D.C.
V ₂	Alfred Hitchcock Presents	D.C.
D.C.	Cosmo Science Fiction	D.C.
L.A.	Murder In A China Shop	N.Y.

Debbie Ruth Gouler	Pha	Finley James Parks, Jr.	D.C.
Leater Turner Hale	Md.	Ann Feilshdy	D.C.
Anna Campbell Hall	Pa.	Joseph Francis Petasovich	Pa.
Heaven Hawthorn Haynes	D.C.	Emmilia Demetris Pissallidas	Va.
John Jane Hickson	D.C.	Ellen Teresa Riley	D.C.
James Meadows Hill	Va.	Barry Michael Rimer	N.J.
William R. Holcomb, III	D.C.	Virginia Lawrence Raven	Va.
(With distinction)		Robert David Reid	Va.
R. Earl Joseph H. Hiler	Va.	LaVerne Helen Richardson	Cal.
Robert Ann Hildbrand	N.M.	Laura Ann Ridgway	Va.
Joseph John Holland	Pa.	Wayne Joseph Rinick	D.C.
Russ Lewis Horenstein	D.C.	Charles Alfred Stuart Robertson	Va.
James Earl Hughes	Va.	Michael Kinsling Rond	Md.
Joanne Westwood Hutchinson	Ark.	Harriet Louis Rosenberg	D.C.
Thomas A. Johnson	Pa.	Roger Benjamin Rossmid	Cal.
Thomas Eugene Johnson	Va.	Thomas Howard Rows	Va.
Dora Helena Johnson	Md.	William Marshall Russell	D.C.
Frank James Kaplan, Jr.	Cal.	John Franklin Saffler, Jr.	Va.
Frederick Carl Kasser	Va.	Ivory Salamy	D.C.
Michael Paul Kerler	D.C.	(With distinction)	
William Paul Kistner	D.C.	Marshall Louis Schellenger	D.C.
Lawrence Eugene Kopp	Md.	Harvey Richard Schiffman	D.C.
Thomas Martin Kovelbaum	D.C.	Margaret Hawley Schneider	Md.
Robert Martin Kovelbaum	Md.	Mary Schneider	D.C.
Robert Warren Kovelbaum	D.C.	Sarah Lou Short	D.C.
Lawrence Frank Kovelbaum	Md.	Ronald Edward Snow	D.C.
(With distinction)		Monroe Paul Starnes	N.J.
Marion Anne Lamm	Va.	Mary Virginia Starnes	Md.
John Anne Lamm	D.C.	Glen Henry Starnes	Md.
Joseph John Lamm	D.C.	(With distinction)	
James Eugene Lee	Va.	John Starnes	D.C.
William Lee	W.Va.	David Lamm Steinbocker	Cal.
William Lee	Va.	Harriet Ann Stone	Va.
Robert Earl Loe	D.C.	James Jack Toner	D.C.
Robert Earl Loe	D.C.	Ellen Eugene Toner	Md.
(With distinction)		John Toner	Pa.
James Loe	D.C.	(With distinction)	
Lawrence Marcus Levy	D.C.	Frederick M. Phyllis	Md.
Thomas John Levy	D.C.	John Anne Toner, Jr.	D.C.
Thomas John Levy	St.	Nella Clark Toner	Va.
Ellen Jane Levy	L.	Kathleen Ann Toner	Md.
James Martin	Va.	Thomas Anthony Toner	Pa.
James Thomas Resmont Martin	D.C.	Glen Howard Toner, Jr.	Md.
James Martin	D.C.	Paul Allen Toner	Pa.
James Martin	D.C.	David Joseph Vankers	Pa.
James Martin	Va.	Charles Albert Wark	Md.
James Martin	D.C.	Robert William Wark	Va.
James Martin	N.Y.	James William Wark	Va.
James Martin	D.C.	Robert Lee Wark	D.C.
James Martin	Md.	Frank William Wark	Va.
James Martin	D.C.	Nancy Evelyn Wark	Va.
James Martin	D.C.	Samuel Lee Wark	Va.
James Martin	Cal.	David Yalton	Md.
James Martin	Md.	William Gerald Yantello	N.J.

COLUMBIAN COLLEGE

BACHELOR OF ARTS

NOVEMBER 11, 1954

Patty Anastopoulos	Cal.	Zina Langhorne Clenton	Va.
Anna Nicholas Anton	Va.	Frank Edward Constant	Va.
Stella Corina Baker	Md.	Robert Bruce Cushman, Jr.	Md.
Yvonne Henry Bunker	Pa.	Frederick Henry Custer	W.Va.
David Jerome Bunker	D.C.	Lisa Williams Davidson	D.C.
Samuel Henry Beach	Va.	Oliver James Davidson	D.C.
Benjamin Bennett	D.C.	Mary Elizabeth Farrar	N.J.
Anthony Bennett	Va.	Ruth Linda Flanagan	Md.
Anthony Marshall Bullock	D.C.	Michael Elvinder Garrison	Va.
John Frank Bullough	Va.		

Henry Clarence Gesterick
 Henry Earl Howenstein
 Barbara Louise Huxner
 Carl Aaron Kagan
 Janet Anna Levine
 Mary Rose Marie Miller
 Patricia Lee Fawcett Mutan
 Bruce Ray Neuman
 (With distinction)
 Fredrick Jean Reagen
 John Wesley Robinson
 Ruth Elzavir Rooster

Va. Harold Schiffman
 Me. Claude Marvin Schonberger
 Md. Sheria Mary Scott
 D.C. Charles Chapman Spencer
 Va. Isabel Alonzo Stephens
 Va. Robert E. Stewart Stephens
 D.C. Jeanette Elizabeth Thayer
 Va. Ruth Cordelia Nash Tyler
 D.C. Anna Isabel Uhl
 Me. (Special honors in Spanish Literature)
 D.C. Marvin Edward Williams

Mass.
 D.C.
 Me.
 U.S.
 D.C.
 Va.
 Cal.
 R.I.
 N.Y.
 Tenn.

FEBRUARY 22, 1955

Miss Belva Alexander
 Roy David Alkowitz
 Eugene Howard Auer
 Patricia Hattie Batson
 Catherine Ellen Blumet
 James Lindsay Brink
 Harold Joseph Dancy
 Arnold Charles Dybeck
 Patricia Fawcett
 William Allen Goldman
 James Gordon Green
 Robert Hanson Green
 Larry Eugene Hill
 Ralph Lindsay Johnson
 James Lee Jones
 James Allen Johnson, Jr.
 Victor David Kasev
 Kenneth Frederick Krippenburg
 Mary Lee Martin
 Norwood Randolph Mason, Jr.
 John Robert McArthur
 Matthew Ruth Menden

Cal. Betty Jean Nowell
 Va. Leonard Hingham Payne
 Va. James Henry Phipps
 Me. Robert Melvin Rapp
 Me. (With distinction)
 Md. Arnold Aaron Rostman
 Md. Lillian Marshall Saxe
 Va. Bernard Schatz
 D.C. Frances Leiken Selby
 D.C. (With distinction)
 D.C. Charlotte Evelyn Seiler
 Utah Jane Sorensen
 Va. Jane Elaine Sorenson
 Me. Stuart Merrill Stahl
 Cal. Linda Patricia Stewart
 Ohio Peter Ruth Sumner
 N.Y. Laura Wanda Thompson
 Me. Ruth Frances Townsend
 Me. Anne Howard White
 Ohio Frances Louise White
 Va. (With distinction) Special honors
 (In Literature)

Va.
 Me.
 Va.
 Cal.
 N.Y.
 Va.
 N.Y.
 D.C.
 Va.
 Ohio
 Me.
 Va.
 N.Y.
 Ohio
 Me.
 Va.
 W. Va.

JUNE 8, 1955

Frank Elton Amos
 James Bruce Amos
 Sam Allen
 William Clayton Anderson
 Frederick Howard Baldwin
 Marie Elizabeth Mason Baldwin
 Margaret Ann Baker
 Leroy Joseph Bickell
 James Frederick Bower
 James Maxwell Brown
 Lee William Cain
 William Leslie Campbell
 Andrew Cain
 Matthew John Clark
 William John Collins
 Anthony Edmund Cook
 William James Dickinson III
 John Francis Dwyer, Jr.
 U.S. 1948 United States Naval Academy
 Michael Collins
 Michelle Frances Connor
 (With distinction)
 Robert MacLaren Cook
 James Monroe Collins
 Marion Paul Dugan
 Jack Thomas Gilman
 U.S. 1948 University of Buffalo
 Philip Malcom Dwyer
 Kenneth Dale Dwyer
 John Allen Elmer
 Linda Lawrence Fales

Va. Zeno Fajonson
 N.Y. Robert James Hansen
 Va. Kenneth Hugh Frazier
 N.C. Patricia LeAnn Felling
 Va. Ralph William Finner
 D.C. Evelyn Mary Gandy
 Me. (With distinction)
 Me. Richard Martin Gaskill
 Va. Judith Anne Gault
 N.Y. Thomas Martin Gault
 Me. Thomas Allen Gossage
 Me. (Special honors in Journalism)
 N.Y. New William Gossage
 Me. (With distinction)
 D.C. Betty Gossage
 Va. Virginia Frances Grant
 Utah Jane Nancy Grubbs
 D.C. Donald Robert Greer
 Robert Lee Thompson
 Hilda Gae Haupt
 Mary Jane Haupt
 Me. Martha Rye Hays
 D.C. Sara Thelma Hayes
 Me. John Joseph Hall
 Va. Donald Raymond Hattis
 N.Y. (With distinction)
 Me. Walter Thomas Hays, Jr.
 Me. Michael Anne Hafford
 N.Y. Gordon Franklin Haver
 Va. Jay William Hewitt
 D.C. Richard Stuart Hinkle

D.C.
 N.Y.
 Me.
 Cal.
 N.Y.
 D.C.
 D.C.
 Va.
 D.C.
 Va.
 Va.
 Va.
 Va.
 Me.
 D.C.
 Va.
 Va.
 Va.
 D.C.
 Va.
 Va.
 D.C.
 Va.

JUNE 8, 1955

Alvin David Auer	D.C.	Peter John Kyne	D.C.
Carolyn Schilling Cook	Md.	Jack Francis Lane	D.C.
(Wash. State Univ.)		George Webster Lottner, Jr.	Md.
Howard Leach Evans	D.C.	(Wash. State Univ.)	Md.
Michael Glendon	Va.	Charles Theodore Lynch	D.C.
Minna Harriet Gosselin	Ill.	Teresa Elizabeth Major	D.C.
Theresa Joseph Gosselin	N.Y.	Gary Jack Nims	D.C.
David Long Jones	D.C.	John David Linderberger	
Minna Webster Patterson	D.C.	(Wash. State Univ.)	
John George Pomeroy	Md.	Isaac Pomeroy	Israel
(Wash. State Univ.)		Howard R. Lee Roberts	N.Y.
Julian Glenwood Quinn, Jr.	Md.	Robert Stanford Rostman	Va.
Gary Edward Ross	Md.	Irene Shusterman	D.C.
Barbara Ann Graham	D.C.	Ann Roscoe Sampson	Va.
Teri Wilson	Md.	Lillian Eliza Spitzer	D.C.
Joseph Thompson	D.C.	Frederic Charles Sykes Stevenson	D.C.
William Jack H. Thomas, Jr.	Va.	Alan R. Thomas	Va.
Robert McCalister Thomas	Va.	Charles Adams White	Va.
James Paul Kinsler	D.C.		

MASTER OF ARTS

NOVEMBER 11, 1954

William Robert Edinger	D.C.	Robert Louis, Jr.	D.C.
A.B. 1950, The George Washington University		A.B. 1951, College of the City of New York	
William Earl Foster	Pa.	A.M. 1950, New York University	
A.B. 1950, Georgetown University		B.D. 1952, American University	D.C.
Frederic Samuel Gosselin	D.C.	Harold Powers	D.C.
A.B. 1951, The George Washington University		A.B. 1951, Columbia University	
Henry Ernest Gosselin	Ill.	Roger George Rostman	D.C.
A.B. 1951, The George Washington University		A.B. 1951, The George Washington University	D.C.
Rafael A. Gosselin	Puerto Rico	Walter Clayton Robinson	Tex.
A.B. 1951, University of Puerto Rico		A.B. 1950, The George Washington University	
George James Gianakos	S.C.	Regina Swanner	Va.
A.B. 1951, University of South Carolina		A.B. 1950, Howard Payne College	
Talbot Gordon Harberg	D.C.	John Maxwell Taggart	Puerto Rico
A.B. 1950, University of Kansas		A.B. 1952, Williams College	
Frederic David Hossel	D.C.	Francisco Jose Umpierre	Va.
A.B. 1951, The George Washington University		A.B. 1950, University of Puerto Rico	
Barton Kenish	D.C.	Richard Sterling Wilkerson	
A.B. 1954, The George Washington University		A.B. 1940, The George Washington University	

FEBRUARY 22, 1955

Grace Lucile Berg	Alaska	Sarah Ruth Peskind	Ill.
A.B. 1940, University of Alaska		A.B. 1950, The George Washington University	N.Y.
Suzanne Duane Hill	N.Y.	Martin Raffner	
A.B. 1954, The George Washington University		A.B. 1958, New York University	

JUNE 8, 1955

Iris Elizabeth Amos	Md.	Wade Richardson Currier	D.C.
A.B. 1940, Western Maryland College		A.B. 1950, The George Washington University	Md.
Gwendolyn Lawrence Braden Carr	Minn.	Roy Aaron Davidson	
A.B. 1951, San Diego State College		A.B. 1951, The George Washington University	

Ernest Herbert Day A.B. 1941, Oberlin College	Ohio	Joseph Louis McElroy, Jr. A.B. 1941, The George Washington University	Maine
L.L.B. 1945, The George Washington University		M. J. Le Williams Page A.B. 1941, Yale University	Pa.
Mary Beulah Ellis A.B. 1941, The George Washington University	D.C.	Rebecca Kismet Pratt A.B. 1941, The George Washington University	D.C.
Gay F. Everett A.B. 1941, The George Washington University	Va.	Ruthie R. Ray A.B. 1941, Beaver College	N.D.
Ariel C. Galt, H. Galt and A.B. 1941, Ohio University	Pa.	Marion Wallace Rockwell A.B. 1941, Bryn Mawr College	Mass.
Henry Warren Kest A.B. 1941, The George Washington University	Pa.	Margaret Ann Rogers B.S. in Ed. 1941, Wheat Teachers College	D.C.
Nick Alexander Kestner A.B. 1941, Missouri College	W.Va.	John Wallace Wallace B.S. 1941, University of Utah	Utah
Mary Ransom Mammey A.B. 1941, The George Washington University	Va.	John Richard White A.B. 1941, Harvard University	D.C.
		Charles Christman, White A.B. 1941, Rockford College	Ill.

MASTER OF SCIENCE

NOVEMBER 11, 1954

Margit Anderson B.S. 1941, The George Washington University	D.C.	Herbert Reed Kashiwa B.S. 1941, University of Hawaii	Hawaii
Nicholas Michael Cantisani B.S. 1941, The George Washington University	D.C.	Louisa McCain Lampkin B.S. 1941, University of Alabama	Ala.
Daniel William Lathrop B.S. 1941, The George Washington University	D.C.	Solomon Levin B.S. 1941, University of Maryland	D.C.
David Robert Evans B.S. 1941, The George Washington University	D.C.	Robert Gladie Moe B.S. 1941, University of Minnesota	Mn.
		William Fordland Ryan B.S. in Math. B.S. in E.E. 1941, University of Michigan	Mi.
		Andrew Marie Seamer A.B. 1941, University of Missouri	Va.

FEBRUARY 22, 1955

Bernard Arer B.S. 1941, College of the City of New York	Mi.	Emily Jeanette Payne B.S. 1941, Wheat Teachers College	D.C.
Nancy Ann Gammie B.S. 1941, Georgia College	Pa.	Ruthie Gertrude Schramm B.S. 1941, The George Washington University	Mi.
Carol R. Johns Goring, Jr. B.S. 1941, The George Washington University	D.C.	Suzanne Singer B.S. 1941, University of Miami	Fla.
Elmer Norman Dargatzis B.S. 1941, The George Washington University	Pa.	John Wesley White B.S. 1941, The George Washington University	Va.
Roger William Lomley B.S. 1941, Loyola College	Mi.	Herbert Womack B.S. 1941, College of the City of New York	Mi.

JUNE 8, 1955

Alfred Frank Relova B.S. 1941, Louisiana University	N.Y.	George Vanders Valmista B.S. 1941, The George Washington University	Va.
Barbara Langston Foster B.S. 1941, Washington College	Mi.	Thomas Ella Wheeler B.S. 1941, Mount Saint Mary's College	Cal.
Barbara Hedberg Horst B.S. 1941, The George Washington University	Va.		

SCHOOL OF MEDICINE

DOCTOR OF MEDICINE

JUNE 8, 1955

Charles Martin Armstrong (Wash. dis.)	D.C.	Walter Lester Galtman A.B. 1933, Southern University	N.Y.
A.P. 1942, The George Washington University		Walter H. Galtman A.B. 1944, University of California at Los Angeles	Calif.
Gordon Baker A.B. 1943, University of California	N.I.	Charles Robert Galt (Wash. dis.)	Me.
Robert Albert Balfour A.B. 1943, University of California	Calif.	A.B. 1943, Lafayette College	Ky.
Ernest David Bane (Wash. dis.)	Va.	Patricia Frances Galtman A.B. 1943, Lafayette College	N.I.
B.S. 1941, Duke University	Me.	John Thomas Galt B.S. 1941, Rutgers University	N.Y.
Charles Donald Bane A.B. 1943, Montana State University	Calif.	Frank George Galt (Wash. dis.)	Me.
Lafayette Eugene Bane B.S. 1941, University of California	D.C.	A.B. 1942, Southern University	Me.
Brian Bane, Jr. (Wash. dis.)		Stanley Ernest Galtman A.B. 1943, University of California	Calif.
B.S. 1941, Franklin and Marshall College	Ala.	Brian Francis Galtman A.B. 1943, University of California	Me.
Ernest Nelson Covert A.B. 1941, Howard College	N.Y.	Robert Milton Galtman A.B. 1941, Howard College	Calif.
Jerome Wolf Covert (Wash. dis.)	Me.	Joseph Anthony Galtman A.B. 1941, The George Washington University	Va.
Ernest Nelson Covert B.S. 1943, American University	D.C.	Daniel Scott Kallam, Jr. A.B. 1942, The George Washington University	D.C.
M.S. 1944, The George Washington University		Adeline Christine Kallam James Charles Kallam, Jr.	N.I.
John Lemsky Chapman Wash. dis. Chervenak	Wash.	Irvin I. Kallam B.S. 1941, Pennsylvania State University	Pa.
Thomas Charles Cook A.B. 1942, The George Washington University	Calif.	Lawrence Roy Kramer A.B. 1943, The George Washington University	Pa.
Ryland Eugene Coffey A.B. 1943, University of California	Va.	Patricia L. Kramer H.B. 1943, The George Washington University	N.Y.
Kenneth Charles Collins A.B. 1942, University of Denver	Calif.	Isabel Lewis, Jr. A.B. 1943, The George Washington University	Hon.
Harvey Paul Collins A.B. 1943, Ohio Wesleyan University	Calif.	Paul George Kramer, Jr. A.B. 1943, The George Washington University	Me.
Frank John Conroy A.B. 1943, San Diego State College	D.C.	Samuel H. Kramer, Jr. A.B. 1943, The George Washington University	Va.
A.M. 1944, Cleveland Graduate School		Paul Herman Kramer Edward Melvin Kramer	Pa.
John Lloyd Cooney A.B. 1943, The George Washington University	Me.	B.S. 1941, The George Washington University	Va.
John Earl Coyle B.S. 1943, The George Washington University	Calif.	Lawrence Charles Kramer B.S. 1941, Pennsylvania State University	Va.
William Aron Cooney (Wash. dis.)	Va.	Isabel Clara Kramer A.B. 1941, Washington and Lee University	Pa.
A.B. 1942, Sweet Briar College		Isabel Marie Kramer A.B. 1943, The George Washington University	Me.
A.M. 1945, The George Washington University	D.C.	Leanne Marie Kramer (Wash. dis.)	Va.
Robert Francis Coyle A.B. 1941, University of Missouri	Wash.	Frederick R. Kramer, M.D. B.S. 1941, Sweet Briar College	Pa.
Richard John Coyle A.B. 1942, University of Washington	Puerto Rico	Carlton William Kramer, Jr. A.B. 1941, The George Washington University	Va.
Frederick Felix Coyle B.S. 1943, The George Washington University			
David Henry Coyle A.B. 1943, The George Washington University	Va.		

Garland Young M. Killeen, Jr.		431	
B.S. 1934, University of Oklahoma	OKla	Robert Baker	N J
H. A. 1936, University of Oklahoma		B.S. 1934, Virginia College	
George Ira Moore, III	Utah	Gay Lloyd Robinson, Jr.	MI
A.B. 1934, Georgetown College	Ida	A.B. 1934, The George Washington	
W. A. 1934, Georgetown College		University	
B.A. 1934, Georgetown College	N.Y.	Lucas Paul Rabinowitz, Jr.	D.C.
Thomas Dean Moore		A.B. 1934, Texas University	
W. A. 1934, Georgetown College	MI	J.D. 1934, The George Washington	
E.S. 1934, Albion University	Ohio	University	
F. A. 1934, Albion University		Richard James Raker	N.Y.
B.S. 1934, The George Washington	Ill.	Marion E. Rabinowitz	Calif.
University		A.B. 1934, University of California	
Frederick Lewis Rake	N.J.	Charles Lee Rake	Va.
A.B. 1934, University of California		Harold George Ralston, Jr.	MI
Charles Ralston Ralston	Ill.	A.B. 1934, Andrews College	
George Ralston Ralston	Ida	Nease Maurice Turt	N.C.
A.B. 1934, The George Washington		B.S. 1934, Wake Forest College	
University		Len Eugene Van Pelt	MI
Ralph Stephen Ralston	N.J.	E.S. 1934, Andrews University	
B.S. 1934, The George Washington		Paul Kenneth Van	Ida
University		W. A. 1934, Andrews	
James Alexander Ralston, Jr.	Va.	William Leonard Warner	Ill.
A.B. 1934, The George Washington		B.S. 1934, Drake University	
University		Paul Timothy Yoder	Ida
		B.S. 1934, Eastern Mennonite College	
		Vernon Cole Young	Utah

THE LAW SCHOOL

BACHELOR OF LAWS

NOVEMBER 11, 1954

NOVEMBER 11, 1954			
Margaret Anne Ballard	N. Y.	William Curtis Hise	Pa.
A.B. 1928, Nazareth College		A.B. 1928, A.M. 1929, University of Illinois	
Earl M. Bower	D.C.	Norbert Philip Hoffer	N. Y.
A.B. 1925, The George Washington University		B.S. 1925, College of the City of New York	
Gary E. Brown	Mich.	Eleazar Hovav Inzive	N. Y.
A.B. 1917, Kalamazoo College		A.B. 1917, Cornell University	
William E. Brown	D.C.	Frederick Isch	N. Y.
W.B. 1922, (University)		B.I.E. 1925, College of the City of New York	
A.B. 1922, The George Washington University		Karl J. Kain	Pa.
Maya S. Amos Chapman	Ala.	A.B. 1928, University of Pennsylvania	
B.S. 1924, Alabama Polytechnic Institute		Leona W. Kautner	Pa.
Arthur H. Carey, Jr.	N. Y.	James Joseph Kautner	Mass.
B.S. 1925, College of the City of New York		B.S. 1924, Pennsylvania Military College	
God Day, Jr.	N. Y.	Ray Edward Keiser	Me.
B.S. 1925, Columbia University		A.B. 1925, Maine University	
Thomas J. Keiser	N. Y.	Thomas Keiser	Pa.
B.S. 1925, Massachusetts Institute of Technology		B.S. 1925, Pennsylvania State Teachers College	
John E. Kohn	Ohio	A.M. 1925, The George Washington University	Mass.
B.S. 1924, University of Toledo		A.B. 1925, The George Washington University	
Norman H. Kohn	Mass.	Russell Lewis Law	Me.
B.S. 1925, M.I.T., Northeastern University		B.S. 1925, Simon Hall University	
John A. Kohn	D.C.	Leona Catherine Leonard	N. J.
A.B. 1917, Lynnmouth College		A.B. 1925, Washington and Lee University	
A.B. 1917, Lynnmouth College		Paul James Miller, Jr.	Mass.
A.B. 1917, University of Kansas	D.C.	B.S. 1925, Massachusetts State College	
Thomas Miller	D.C.	A.M. 1943, American University	
B.S. 1925, University of Pittsburgh		John Ramon Moly	N. J.
George Charles Heister, Jr.	Me.	A.B. 1925, Montclair College	
John M. Heister, Jr.	Ill.		
A.B. 1925, University of Maryland			
University of The George Washington			

Anthony Alvares (O'Brien)	MI	Albert Willis Scribner	MI
B.A.E. 1930, The George Washington University		B.S. 1912, Northwestern University	
James Lewis O'Brien	MI	M.S. 1920, University of New Hampshire	Va.
Russell Elmer Foster	D.C.	Charles Leonard Snavely	Va.
B.S. 1931, University of Maryland		A.B. 1927, Lincoln Memorial University	Va.
Edward Thomas Forsythe	R.I.	Veronica Helen Sweney	Va.
B.S. 1927, D.F.E. 1928, Renassiaet Polytechnic Institute		B.S. 1942, Boston College	Va.
Hubert Allen Parsons, Jr.	MI	John Stanley Tamm	
B.S. 1940, Michigan State College		A.B. 1947, Pennsylvania State College of Education	D.C.
Charles Allen Foster	Va.	Samuel Thomas III	
B.S. in E.E. 1942, Pennsylvania State University		B.S. 1947, University of North Carolina	N.H.
Joseph C. Richmond, Jr.	MI	Wendell Newton Vinton	
B.S. in E.E. 1944, Tufts College		B.E.E. 1949, University of New Hampshire	Va.
D.F.E. 1945, The George Washington University		Walter Lawrence Voss	
John Allen Rorback, Jr.	Va.	B.S. 1941, The George Washington University	MI
B.S. 1945, Northwestern University		Phyllis Helen Van Pelt	
John Louis Rorback	IL	A.B. 1941, Boston University	Pa.
B.S. in E.E. 1944, University of Illinois		Leon Paul Wagner	
		A.B. 1940, Colby College	
		M.D. 1944, University of Pennsylvania	

FEBRUARY 22, 1955

William Ross Alcock, Jr.	D.C.	Ernest Miller Jenkins	N.H.
A.B. 1920, Stanford University		B.S. 1929, University of New Hampshire	D.C.
Herbert Horowitz Kagan	Va.	David Lee Klein	Va.
A.B. 1927, Harvard University		B.C.E. 1940, Cooper Union	
Russell Thomas Kagan	MI	Russell Charles Klein	Pa.
B.S. in E.E. 1944, University of Michigan		B.S. 1941, Pennsylvania State University	
Landis Frank Kagan	N.I.	John Korman	MI
A.B. 1944, Rutgers University		B.S. 1920, Pennsylvania State University	
Donald Ross Campbell	Pa.	Philip Elmer Koser	MI
B.S. 1941, Renassiaet Polytechnic Institute		B.S. 1944, University of Maryland	
Russell Elmer Clark, Jr.	Del.	Sam Lebowitz	
A.B. 1937, Dickinson College		B.S. 1940, College of the City of New York	D.C.
Joseph Paul Clark	MI	John Charles Mowbray	Wa.
A.B. 1940, St. Anthony College		A.B. 1949, University of Minnesota	
John Vernon Cleveland	D.C.	Arthur David Newman	Mo.
A.B. 1944, Catholic University of America		B.S. 1940, Minnesota State College	
William George Gonsky	N.Y.	Walter Franklin Norris	D.C.
B.S. 1937, Quinn College and University		A.B. 1941, Westminster College, Mo.	W.Va.
Harold Elmer Gossman	Va.	John Raymond O'Neil	
A.B. 1941, University of Richmond		Jack Pat O'Neil	N.Y.
Ernest Elmer Gossman	MI	B.S. 1940, West Virginia University	
A.B. 1940, The George Washington University		Edward Joseph Rasmussen	
Paul Elmer Gossman	N.Y.	B.S. 1947, College of the Holy Cross	Haw.
A.B. 1940, Brooklyn College		M.A. 1951, New York State College	
Thomas Frederick Hecker	MI	Frederick William Rasmussen	N.Y.
B.S. 1940, Massachusetts Institute of Technology		A.B. 1940, Yale University	
Walter Elmer Hight	Conn.	Samuel Raymond Rasmussen	
A.B. in E.E. 1940, The George Washington University		B.S. in E.E. 1941, The George Washington University	Va.
Allen Harwood	Hawaii	Walter Elmer Hight	Conn.
A.B. 1940, University of Hawaii		A.B. 1940, The George Washington University	
William Elmer Hight	D.C.	Harold Smith	D.C.
B.S. 1940, Tufts College		B.S. 1940, University of Connecticut	
Harold Elmer Hight	Va.	Elmer Edgerton	MI
A.B. 1941, Northwestern College		B.S. 1940, New York University	
Frank Elmer Hight	MI	B.S. 1940, Columbia University	
B.S. 1940, University of Maryland		Allen Aaron Spang	
George Elmer Jones	D.C.	A.B. 1946, College of the City of New York	
A.B. 1940, University of Oklahoma			

Seymour Stahl	D.C.	Robert Edward Strassner	D.C.
B.S. 1942, University of Miami		B.S. 1940, Pennsylvania State	
Robert Louis Stenger	D.C.	University	
B.B. 1939, Yale University		Roscoe Vernon Watson	Calif.
Water Street 27		A.B. 1937, The George Washington	
B.S. 1937, College of the City of	M.I.	University	
New York		Jack Webster Watkins	Iowa
John Harvey Stupak	D.C.	A.B. 1948, State University of Iowa	
B.S. 1942, University of Maryland		Jack Russell Webb	Mo.
Joseph Carson Street		A.B. 1948, University of Kansas	
A.B. 1938, Dickinson College	Va.		

(Bachelor of Laws in National University)

(Bachelor of Laws in National University)			
W. Sam Arthur Aubio	W	Paul Douglas Johnson	NM
B.S. 1941, University of Washington		B.S. 1941, University of Southern California	
John Maurice Bechhoff	MJ	James A. Jones	D C
B.S. 1942, University of Maryland		A.M. 1944, University of Maryland	
George Wayne Chapperson	MJ	Dwight G. Reardon	N C
Dean J. Joseph Florkin	MJ	B.S. 1942, University of Maryland	
A.B. 1942, Mount St. Mary's College		Donald M. S. Sorenson	N C
Arnold Lee Hudman	MJ	B.S. 1942, North Carolina State College	
		Lawrence L. Williams	MJ
		B.S. 1941, University of Maryland	

JUNE 8, 1955

[illegible]

Ralph Wellington McIntire, Jr. B.S. 1920, University of Pittsburgh	MD	Charles Andrew Schmidt B.S. 1922, University of Utah	Utah
John Morton M. Lee American Medical A.B. 1921, Vanderbilt University	Ark Md	Ernest Maxine Stamositz A.B. 1921, The George Washington University	D.C
Robert Henry Morgan B.S. in Eng. 1920, The George Washington University	Md	Richard Abraham Silver A.B. 1921, Boston University	Mass
John Arthur Murphy B.S. 1920, Pennsylvania University	Md	Norman Frederick Siskin A.B. 1921, Ohio Wesleyan University	Ohio
James Lloyd Parker A.B. 1921, The George Washington University	Md	Forbes Edgar Smith B.S. in E.E. 1920, Purdue University	Ind
Donald Ferguson B.S. 1920, University of California	Calif	John Robert Smith B.M.E. 1920, Carleton University of America	Md
Jack Martin Pickett A.B. 1920, The George Washington University	Va	Kenneth Paul Smith Law, Harvard Univ.	Ind W Va
Ralph William Pielow B.S. 1921, University of Maryland	Va	B.S. 1921, University of Tennessee	
Paul Joseph Reimann B.S. in M.E. 1921, University of Illinois	Md	M.S. 1921, West Virginia University	Va
Frederic A. Munka Rinehart B.M.E. 1922, The George Washington University	Md	Robert Madison Ussell A.B. 1920, Edgewood University	Calif
William Daniel Robertson B.S. 1921, The George Washington University	Md	John Wayne Venable A.B. 1921, Stanford University	Md
Arden Irving Rubin A.B. 1922, Livingston College	Pt	Peter Roskoff Walker A.B. 1921, Harvard University	Va
John Maynard Rume A.B. 1921, University of California at Los Angeles	Ohio	Robert Daniel Walling (West. Institution)	
		B.S. in E.E. 1920, B.S. in B.A. 1920, Lehigh University	Ill
		Nathan Nathan Warner A.B. 1921, Catholic University of America	D.C
		Irving Wendt A.B. 1922, The George Washington University	Ohio
		Edmond Cecil Wells	

(Bachelor of Laws in National University)

Donald Frederick Berman B.S. in M.E. 1922, Tri-State College	Mich	Arnold David Hooks Mary in Kansas	Va Pa N.Y.
Stephen Mendenhall Bowles Richard Stephen Carroll Bertram George Evans (Honor Society)	Md Mass Md	Clarence Lantier Daniel Mylchre (Honor Society)	
James Vincent Parnell Eugene Copley Pridmore Kenneth Edward Grier A.B. 1921, University of Kansas	Va Ark Ky	B.S. 1921, University of Pittsburgh	D.C
John Thomas Hallock James Hayner	Va Md	Lawrence James Smith B.S. 1922, Georgetown University	D.C
		George Yandley Wheeler II A.B. 1921, Princeton University	Va
		Luke Edward White	

JURIS DOCTOR

NOVEMBER 11, 1954

Joseph John Keefe B.S. 1922, Ohio State University	Va	Bernard Arthur Shugart A.B. 1920, The George Washington University	Va
Harriet Russell Johnson A.B. 1921, Smith College	Ky	Thomas Edward Tyler B.S. 1921, University of Maryland	Md
Samuel H. Katz B.S. in Chem. Eng. 1928, College of the City of New York	N.Y.	Conrad Paul Weaver A.B. 1928, Washington College	Md

FEBRUARY 22, 1955

George Elmer Jr. B.S. A. 1929, Western Reserve University	W.Va.	George Goldin A.B. 1922, The George Washington University	D.C W.Va
Jack Williamson Pilsam B.S. 1922, University of Illinois	Va	Elias William Light, Jr. B.S. 1928, West Virginia University	

Degrees Conferred

435

Maurice Ben Stiefel B.S. 1931, University of Pennsylvania Richard Austin Wier (With distinction) B.B.A. 1943, University of Texas	Pa. Texas	Ned Earl Williams, Jr. B.S. 1943, United States Coast Guard Academy	N.D.
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JUNE 8, 1955

Elmer Thomas, Baltimore A.B. 1927, Howard College Robert Austin Bopp B.S. 1929, United States Naval Academy Robert Edwin Galtner B.S. 1929, University of Michigan Marion Allen Clark, Jr. (With distinction) B.S. 1931, University of Maryland L. R. Ralston, Jr. B.S. 1931, University of Mass. James Wesley Cooper B.S. 1932, Utah State Agricultural College Frederick Arthur Fawcett B.S. 1932, University of Missouri Theodore Russell Foster, Jr. B.M.E. 1932, General Institute of Technology Aron Isaacson, Portland A.B. 1932, Wellesley College Aron Isaacson, Portland B.S. 1932, Wellesley College Charles Franklyn Givens B.S. 1932, University of Texas B.S. 1932, United States Naval Academy	Me. Va. Me. Pa. Texas Mass. Ind. Calif. Va. D.C. D.C. N.D.	Donald Lloyd Halliday C.B. 1932, University of Virginia William David Johnson A.B. 1932, Maryland College Hanna Mark Tamm A.B. 1932, Brigham Young University S. M. Young, Jr. A.B. 1932, University of Pittsburgh A. J. Seymour, Jr. A.B. 1932, University of Pennsylvania Robert Earl Matheson B.S. 1932, Brigham Young University Robert Arnold Boring A.B. 1932, University of Pittsburgh A.M. 1932, American University William Fulton Perry A.B. 1932, A.M. 1932, Catholic University of America Paul William Sullivan A.B. 1932, Southeast Missouri State College William Blaine Smith A.B. 1932, Lehigh University James Russell Young A.B. 1932, University of Chicago	Va. Me. Ind. Pa. Pa. Va. Va. Me. Va. Va. Va.
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MASTER OF LAWS FEBRUARY 22, 1955

Leola Archibald B.S. 1937, University of Florida Leland Earle Bopp B.S. 1937, University of Colorado L. L. 1937, The George Washington University James Wesley Brinkner A.B. 1937, University of Tennessee John Louis Perry B.S. 1937, LL.B. 1949, Georgetown University	Fla. Va. Pa. Tenn. Pa.	Elmer Samuel Gerber A.B. 1937, J.D. 1951, University of Michigan Paul Matheson B.S. 1937, Lehigh University LL.B. 1951, University of Pennsylvania Robert Smith Young B.S. 1937, LL.B. 1952, University of Alabama	Mich. Pa. Ala.
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(Master of Laws in National University)

Jack Charles Perry, Jr. LL.B. 1937, University of Alabama	Ala.
--	------

JUNE 8, 1955

Robert Marshall Jones J.D. 1937, LL.B. 1954, Boston University William James Givens, Jr. B.S. 1937, United States Merchant Marine Academy L. L. 1937, The George Washington University	Mass. D.C.	John Fink A.B. 1937, LL.B. 1951, The George Washington University Bernard James Townsend, Jr. B.S. 1937, University of California LL.B. 1951, University of Southern California	D.C. D.C.
---	---------------	---	--------------

Clyde Linhart Grisham B.S. 1932, LL.B. 1941, Boston University	Va	Romer P. Shantz B.S. 1943, LL.B. 1950, Georgetown University	D.C.
Reginald Lewis Higgins B.S. 1940, University of Maryland LL.B. 1945, The George Washington University	Md.	Satan, T. John B.S. 1945, College of the City of New York	Va.
William Hinson B.S. in Eng. 1935, Iowa State College LL.B. 1945, University of Iowa	Iowa	M.J.A. 1945, New York University LL.D. 1946, The American Washington University	Va.
Robert Thomas Gandy B.S. 1941, University of Pennsylvania LL.B. 1945, The George Washington University	Md.	Walter Arthur Williams A.B. 1940, Indiana College LL.B. 1941, University of Wisconsin	

(Master of Laws in National University)

Romer Edward Duckett S.C.
B.S. 1935, Florida University
LL.B. 1953, National University

MASTER OF COMPARATIVE LAW

NOVEMBER 11, 1954

Bernard Andrina Dubois A.B. 1918, LL.B. 1945, University of Paris	D.C.	Hwang Han Kim LL.B. 1949, Seoul National University	Korea
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FEBRUARY 22, 1955

Ruben Eison M.L.S. 1944 1942, University of Lodz Dr. Pol. Sc. 1949, University of Vienna	Ohio	Chun Kim LL.B. 1941, University of Korea	Korea
---	------	---	-------

JUNE 8, 1955

Suzey Bhattacharya LL.B. 1944, University of Thammasat, Thailand	D.C.	Ahmed El Shalakany Licence en Droit 1944, Dip. in Econ 1950, University of Cairo	Egypt
--	------	--	-------

MASTER OF COMPARATIVE LAW (American Practice)

FEBRUARY 22, 1955

Alphons J. M. de Leeuw Lic. Jur. 1945, University of Utrecht, The Netherlands	D.C.	Aimara Riva Magister Juris 1939, University of Lutvia Doctor Juris 1947, UNRRA University, Munich, Germany	D.C.
---	------	--	------

JUNE 8, 1955

Andr. Holmer Lic. Juris, Charles University of Prague Stephan Kautsky Lic. Juris, Charles University of Prague	D.C.	E.E. Rossmandel Licentiate in Law 1942, University of Turin, Italy	Md.
---	------	--	-----

DOCTOR OF JURIDICAL SCIENCE

FEBRUARY 22, 1955

Harvey Milton Spurr N.Y.
A.B. 1940, Brown University
LL.B. 1945, Harvard University
A.M. in Comp. 1949, LL.M. 1952, The
George Washington University
Dissertation: "Federal Tax Con-
sequences of Corporate Reorganizations
Under the 1939 Internal Revenue
Code as Amended up to the Internal
Revenue Code of 1954"

JUNE 8, 1955

Harold Vincent Bessert MD
 J. P. O'Connell University of Notre Dame
 LL.B. 1947 Catholic University of
 America
 Doctor of Philosophy and Com-
 munity of the University of the
 Americas, Washington, D.C. 1947
 The University of Maryland
 Act

SCHOOL OF ENGINEERING

BACHELOR OF CIVIL ENGINEERING

NOVEMBER 11, 1954

James Katsivadas

Va Pirescha Swardthart

D.C.

JUNE 8, 1955

Rail Hotelier
 Kato Mary Ann Fellows
 Leonard Gorman I. University of
 Boston's Maritime Graduate
 Alberto Giraldi

D.C. Paul Kenna
 V.C. Stuart Thornton Terrell III
 D.C. William Aubert Wendenover
 M.I. Sissy Zervakis

Va
 D.C.
 M.I.

BACHELOR OF ELECTRICAL ENGINEERING

NOVEMBER 11, 1954

Raymond Vincent Nolan

Va Lawrence Joseph Simonson

D.C.

FEBRUARY 22, 1955

Bertel Eugene McClure

D.C. John Gilbert St. Clair

Va

JUNE 8, 1955

Helen Marian Brandler
 John Lutz Thomas
 William Francis Brown
 Clara Ann Kennedy
 (A. M. University)
 John Thomas King
 Della Kaye Robinson
 Robert Paul Little

D.C. Carl Fosse McCull
 D.C. William Edward Miles
 M.I. Lucinda S. de Moraes
 M.I. Ronald William Noy
 W.Va. David Emerson Roberts
 Va. Jack Fawcett Steel
 D.C. Stanley H. Vign
 William Heriberto Wood

Va
 M.I.
 L.C.
 Va
 M.I.
 M.I.
 Va
 Va

BACHELOR OF MECHANICAL ENGINEERING

NOVEMBER 11, 1954

Robert Desmond Harris

Va

FEBRUARY 22, 1955

Allen Beersing Davis
 A.B. 1945 The George Washington
 University

M.I. Charles Earl Smith

M.I.

JUNE 8, 1955

Arthur Khatib Axel
 George Raymond Bierman

Michigan M.I. Christopher Katherine Brown
 Va. Hilda Joseph Chodley

Va
 D.C.

THE SCHOOL OF EDUCATION
BACHELOR OF ARTS IN EDUCATION

NOVEMBER 11, 1954

[illegible]

FEBRUARY 22, 1955

Alexander Hamilton, Alexander
 Young Hamilton, Joseph
 Anne Mary Dore

FEBRUARY 22, 1955

RI Frank Leonard Martin, Jr
 Va E. Lane Berke, White

JUNE 8, 1955

Barbara Ann Bailey	Va	Lois Korman Hill	Ma
James Patrick Baker	N J	Ronald Lawrence May	Ma
Charles Stuart Bannister	Va	William Eugene McNew	Pa
Marjorie Louise Bannister	Va	Marion Meyers	Pa
Paul Lawrence Bayne	Va	Lucy Bessie Minton	Ma
Ruth Evelyn Bayne	Va	Charlotte Newman Minton	Ma
Robert Earl Bayne	Hawa	Harvey Thomas Packard	Pa
William Scott Bayne	Va	James A. Peters	Pa
Frances Barbara Eber	Va	Clarence William Tremblay	Pa
Samuel Maurice Eland	Pa	Frederic Ames Whitford	Pa
Robt Evelyn Hale	Mass		
	N C		

BACHELOR OF SCIENCE IN HOME ECONOMICS

NOVEMBER 11, 1954

Barbara Diane Hendrick

FEBRUARY 22, 1955

Library 22, 1955
Lamp, Loh, Lott, P. H. H. H.
DC

JUNE 8, 1955

Carol Fuller Hastings

BACHELOR OF SCIENCE IN PHYSICAL EDUCATION

NOVEMBER 11, 1954

NOVEMBER 11, 1954

FEBRUARY 22, 1955

James Raymond Matthews

JUNE 8, 1955

1. Mr. William Barr
 2. Mr. Fred L. Bantam
 3. Mr. H. C. C. C. C.
 4. Mr. J. J. J. J. J.

JUNE 8, 1955

1. Mr. W. W. W. W. W.
 2. Mr. J. J. J. J. J.
 3. Mr. J. J. J. J. J.
 4. Mr. J. J. J. J. J.

MASTER OF ARTS IN EDUCATION

NOVEMBER 11, 1954

Mary Emma Armstrong	ME	James Schenck M. Starnes	SY
A.B. 1941, Miami College		B.S. 1943, Pennsylvania State University	
Donald William Carlson	ME	Mary Anna Murray	PS
B.S. 1939, Northwest Missouri State College		B.M.E. 1941, Ohio College	
Rebecca Lanning Coffey	D.C.	Anna Hedrick Moxley	VA
B.S. 1947, University of Maryland		B.S. 1944, Madison College	
Kenneth Stanley Crabtree	ME	Irma Emma Myers	VA
A.B. 1933, Washington-Missouri College		A.B. 1935, College of William and Mary	
A.M. 1946, Seventh Day Adventist Educational Society		Renee Arthur Myers	VA
Samuel John Davis	VA	B.S. 1923, College of William and Mary	
B.S. 1941, Pennsylvania State Teachers College, Harrisburg		Mary Virginia Murray	Puerto Rico
Virginia Emma DeLongue	VA	Augusta Murray Quinlan	
B.S. 1942, Pennsylvania State Teachers College, Harrisburg		A.B. 1924, College of St. Catherine	Mass.
Clarence Miller J. Egan	VA	Irving Morris Ruckel	Mass.
A.B. 1941, Philadelphia College		A.B. 1931, West Liberty State College	
Thomas Donald Leonard	VA	Frances Louise Ruff	VA
A.B. 1941, The College of William and Mary		A.B. 1940, College of William and Mary	
Emile Louis Fawcett	W.V.	Robert Stanley Robinson	VA
A.B. 1940, Maryland College		B.S. 1940, The George Washington University	
Alvin M. Lawrence	VA	Frederic L. Scott, Jr.	
A.B. 1940, East Carolina College		B.S. 1942, Pennsylvania State Teachers College, West Chester	VA
John Joseph Lewicki	ME	Sarah Melissa Tate	VA
B.S. 1941, West Virginia College		B.S. 1941, Madison College	
Mary Ellen Mack	W.V.	Elmer Elmer Thacker	W.V.
A.B. 1941, Maryland College		B.S. 1941, Mary Washington College	
Leslie Rennie Jones	ME	Leona Hill Thomas	Pa.
A.B. 1940, Washington College		A.B. 1940, Maryland College	
John Leslie Jones	Tenn.	Robert Lawrence Thomas	
A.B. 1940, New Mexico College		B.S. 1941, Pennsylvania State Teachers College, West Chester	
Harold Jones	VA	Elmer Calvin Wayne	SC
B.S. 1941, Madison College		A.B. 1940, Madison College	
Margaret Ray Johnson	VA	Virginia Thompson Yarn	
B.S. 1941, Mary Washington College		A.B. 1940, Georgia State College for Women	
Kathleen Lee Kemp	ME	A.B. 1941, Pennsylvania State University	
B.S. 1941, St. Joseph College, Md.			

FEBRUARY 22, 1955

William Bradley	ME	Nancy Rebecca Hunt	VA
D.C. 1949, Eastern United College		B.S. 1949, University of Maryland	
A.B. 1941, The College of William and Mary		Frances Marion	PS
John Joseph Korman	VA	A.B. 1941, The College of William and Mary	
B.S. 1941, Madison College		Charles Henry Moxley	VA
John Joseph Korman	Conn.	B.S. 1941, Virginia Polytechnic Institute	
B.S. 1941, Maryland State College		Edith Louise Scott	VA
John Joseph Korman	Calif.	B.S. 1941, Madison College	
B.S. 1941, University of Maryland		John Joseph Korman	PS
Anna Louise Korman	D.C.	A.B. 1941, The College of William and Mary	
A.B. 1941, University of Maryland		John Joseph Korman	VA
John Joseph Korman	D.C.	John Joseph Korman	
A.B. 1941, Pennsylvania State Teachers College		B.S. 1941, West Virginia College	
John Joseph Korman	D.C.		
B.S. 1941, West Virginia College			
John Joseph Korman	ME		
A.B. 1941, University of North Carolina			

JUNE 8, 1955

Ang. Catholic, Alton		Thomas Marie Haxton	Va
B.S. 1947, Western Teachers College	MD	A.B. 1941, Rochester Medical College	
Rel. Chas. Alton		Henry Haxton	Va
A.B. 1941, The George	N Y	A.B. 1941, Mary Baldwin College	
Washington University		Anna Mary Kinnison	VI
M.S. 1947, Butler	Mich	B.S. 1941, Vermont State Teachers	
D.S. 1947, University of Minnesota		William Kinnison	D.C.
Darius M. Kinnison		A.B. 1941, Northern Illinois	
A.P. 1947, Western State Teachers	D.C.	State Teachers College	
Ang. Catholic, Alton		Edward Moore Scott	D.C.
B.S. 1947, Western State Teachers	Va	A.B. 1941, The George	
Washington University		Washington University	
Frank Albert Galt	MD	Ang. Catholic, N.Y.	MD
A.B. 1941, The George		B.S. 1941, Maryland State Teachers	
Washington University		College, Prince Georges	
Rel. Chas. Alton		A.P. 1947, Rochester Medical Western	
B.S. 1947, Pennsylvania State Teachers	Va	College	
College, Long Beach		Marie Louise Foster	Okla.
Long Beach, Calif.		A.B. 1941, Central State College	
B.S. 1947, The George	N.Y.	Madison Blanton Johnson	MD
Washington University		A.B. 1941, Radcliffe College	
Long Beach, Calif.		Madison Ch. Foster	Va
Long Beach, Calif.		A.B. 1941, Emory and Henry College	
Long Beach, Calif.		Vernon Lee Wilson	D.C.
Long Beach, Calif.		B.S. 1947, Union College	

DOCTOR OF EDUCATION

NOVEMBER 11, 1954

Samuel E. Kinnison		Nelle Zella Thompson	Neb.
B.S. 1947, M.S. 1947, College of the	D.C.	A.B. 1941, A.M. 1947, The George Washington University	
City of New York		Dissertation: "The Educational of	
A.M. 1947, The George Washington University		Program of Communication in Text	
Washington University		Books"	

FEBRUARY 22, 1955

S. M. Linn			
B.S. 1941, A.M. 1947, West Virginia			
University			
Dissertation: "The Role of the Hall			
in the Education of the Child"			

JUNE 8, 1955

James W. Linn			
B.S. 1941, M.S. 1947, State College			
A.M. 1947, The George Washington			
University			
Dissertation: "The Role of the Hall			
in the Education of the Child"			
Research Activities Program			

BACHELOR OF ARTS IN GOVERNMENT

M.
I
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M
D

Charles Vernon Bolt	ME	Joanna Kramer
James Henry Clark	Town	Gracie Russell Mays
John Stanley Connolly, Jr.	Va	Grace Thomas Maffey
William F. Fenn	Conn	Anna Lee Mearns
William Charles Fennelot	ME	Anna Lee Moran
Frederic M. Fox	Main	Frank Kenneth Newman
William M. Gaffney, President	Va	Samuel Joseph S. Nichols
Charles H. Gifford	Tenn	Gracie W. Nichols
Robert L. Gifford, Secy.	Kent	Stanley Joseph Sienkowski
John H. Glendon	Conn	Marion Louise Tucke
William Harris Ketter	Ta	Leo Weitzel

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William Walter Anderson	I	Donald Edward Lewis
William George Appleton	I & C	Louis Earl Mack
William Carlton Burdette	Va	Robert Thomas McChelland
William Mark Bevis	Texas	Myron Gilbert Mearns
John Joseph Beck	N. I.	Joseph William Patterson
(With Associates)		John P. Pitzer
Paul Francis Biddle	Mo.	James Boston Rens
Arthur Leslie Bissness	I & C	George W. Smith
Robert Alexander Campbell, Jr.	I & C	Harold Francis Thomas
Samuel K. Carter	I & C	Blanche Lewis Wadsworth
Mark Allen Chace	Texas	(With Associates)
Robert Edward Chisholm	Mo.	Dale Harsh Wason
Thomas Grover Leach, Jr.	Texas	

PC
PC
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Clarence Henry Alsopugh, Jr.	Va	Harry William Kestles	
Clay, Amanda	D/C	Helen Gertrude King, Jr	
Harry Baynes	Va	Sharon Lynn Lauer	
James Lynn Boston	D/C	John Van Roe Lenthacher	
John Francis Buckingham	D/C	John Walter Lewis	
Lan, Philip Campbell	D/C	Sperry George Mannington	
(W. L. Johnston)		John Thomas Marsden	
John Angus Campbell	D/C	Frank Louis Marston	
Vernon John Casagratia	Va	John Terrence McCallie	
(W. L. Johnston)		Mervin Bruce McDonald	
(W. L. Johnston)		(W. L. Johnston)	
Gerrard Aubrey Clark	Va		
Edward Roy Combs	D/C	Earl Kenneth Moore	
Edgar Cravens	N.I.	Association Office, Jr	
Harold Moore Jones	D/C	Steven Nathaniel Ostro	
Christina Lee DeGarmo	D/C	Jack Owens	
Carl Michael DeLong	F4	Eric James Paparella	
James Morgan Evans	M4	Scott Lee Pearson	
Dorothy Catherine Drake	M4	William Walter Ransom	
John May Egan	Emerson	Harold Kaitera F. G. Gano	
Georgie William Evans, Jr	D/C	Ralph James Rosenbaum	
John Bremer Egan	Gr	David Wayne Sauer	
Marshall Thomas Farned IV	D/C	Edward Seymour Jr	
Dorothy Allen Hager	Truman	Frank James Sweeney	
Charles Leighton Hall	M4	Edward Milton Sweeney	
Allen Edward Hanson	D/C	Malcolm Sweeney	
John Michael Hanson	Va	Mark Sweeney	
John Milton Hanson	D/C	James Edward Thompson, Jr.	
Henry Franklin Hughes	D/C	Michael E. Vetter, Jr.	
Stanley Clark Hume	D/C	Vivian Vetter	
Melvin James Hunter	Va	Kathleen Patricia Weatherford	
David Allen Jackson	D/C	Karen Wilbur	
James Theodore Johnson	M4	John William Wydio	
Robert William Jones	M4	Frank Campbell York	
Edward Kenneth	Va	Ellis Reed Zeh	

MASTER OF ARTS IN GOVERNMENT

NOVEMBER 11, 1954

William Rayburn, J. Carey, Jr. A.B. 1951, Washington State College	Wash.	Henry Arnold Grossman A.B. 1949, Pennsylvania State University	Pa.
Robert Fleming Jones A.B. 1947, University of Alabama	Ala.	John Stephen Hunt, Jr. M.M. 1947, Syracuse University	N.Y.
John R. Jones, Jr. A.B. 1951, The George Washington University	D.C.	Henry Fred Parker A.B. 1944, College of William and Mary	Va.

FEBRUARY 22, 1955

Stanley Jay Batten A.B. 1951, American College, Camden, N.J.	Laurel	Verd Stappert Kopp A.B. 1951, Eastern College	Va.
Marion DeWitt Feltz B.S. 1954, Western Kentucky College	D.C.	Harold Graham McNamee B.S. 1954, University of Georgia	Ga.
John L. Jones B.S. 1947, New York University	N.Y.	Sarah Anna Harold More A.B. 1951, American College, Camden, N.J.	Laurel
Charles William Kaine, Jr. A.B. 1951, Western College	La.	Sennet Rella Paine B.M. 1949, University of Maryland	Towson
Robert Max Kopp A.B. 1949, The George Washington University	Va.	Robert Lee Thomas A.B. 1951, The George Washington University	Va.
Walter Eugene Kopp B.S. 1951, University of Georgia	D.C.		

JUNE 8, 1955

Joseph C. Crider B.S. 1942, Georgetown University	Va.	Kenneth Lathrop Parkhurst A.B. 1951, American College	Va.
Robert Leroy Hight A.B. 1951, Swarthmore College	D.C.	Mary Ann Jones A.B. 1951, B.D. 1951, D.D. 1951	D.C.
Camille J. Johnson A.B. 1951, The George Washington University	N.J.	Mary Ann Jones A.B. 1951, University of Southern California	Calif.
A. M. Johnson A.B. 1951, American University of Beirut	Jordan	Elizabeth F. Wright A.B. 1951, American College	Va.

MASTER OF ARTS IN PERSONNEL ADMINISTRATION

FEBRUARY 22, 1955

Phyllis Mary Jones B.S. 1951, State University	W.Va.
---	-------

JUNE 8, 1955

William Edward Paine B.S. 1951, University of Maryland	Calif.
---	--------

MASTER OF ARTS IN PUBLIC ADMINISTRATION

NOVEMBER 11, 1954

Otto William Helm B.S. 1951, Virginia Polytechnic Institute	Va.
--	-----

FEBRUARY 22, 1955

Robert Lee Brown B.S. 1951, University of Missouri	Mo.
---	-----

JUNE 8, 1955

William Mitchell Crapo, Jr.
A.B. 1926, University of Washington
M.B.A. 1927, Stanford University

N.C.

Edward Rockwell Kramann
B.B.A. 1941, M.B.A. 1945, Northeastern University

Mass.

MASTER OF BUSINESS ADMINISTRATION

NOVEMBER 11, 1954

James Carroll Gaudin
B.S. 1942, Tennessee Polytechnic Institute
LL.B. 1948, University of Tennessee

Tenn.

Charles Fred Parsons
A.B. 1946, 1949, The George Washington University

Ark.

FEBRUARY 22, 1955

Ralph Robertson Bower
B.S. 1942, Ohio State University
Albert Arthur Jockel
A.B. 1944, The George Washington University
Lester Earl Smith
A.B. 1946, 1947, The George Washington University

Ohio

Va.

Md.

John Frank Features
A.B. 1946, University of North Carolina
Edna Washington
A.B. 1946, Mount State Teachers College, N.D.

Miss.

Va.

JUNE 8, 1955

John Jacob Avey, Jr.
B.S. 1947, Tulane University
Edward Thomas Baschala
B.S. 1944, University of Maryland
Melyon Berkowitz
Graduate 1949, United States Air Force Institute of Technology
Arthur Lester Biberstein
Graduate 1951, United States Air Force Institute of Technology
Mervyn Ray Bostine
B.S. 1947, Kean College
Earl L. Bozeman
B.S. 1948, Alabama Polytechnic Institute
George John Boyce, Jr.
A.B. 1946, University of Michigan
Marion LeRoy Eiska
B.S. 1944, Syracuse University
Thomas Louis Cannon
B.S. 1947, Rhode Island State College
Leta Alexander Davis
B.S. 1947, Rutgers Polytechnic Institute
Leta Fyfe Decker
Graduate 1949, United States Air Force Institute of Technology
Leta Charles Dye
B.S. 1947, United States Naval Academy
M.S. 1948, Massachusetts Institute of Technology
Edward William Edwards, Jr.
A.B. 1944, University of Chicago
William Hugh Edwards
B.S. 1941, Indiana State Teachers College
Ralph Herold Feinger
B.S. 1944, University of Maryland

Va.

N.Y.

Miss.

Calif.

Va.

Md.

Miss.

N.Y.

R.I.

N.Y.

Miss.

Va.

D.C.

Va.

N.Y.

Calif.

N.Y.

Calif.

N.Y.

N.Y.

Joseph Paul Fitz-Patrick
B.S. 1948, United States Naval Academy
A.M. 1947, Columbia University
Norman Fwing Fines, Jr.
B.S. 1946, United States Naval Academy
Kenneth Willis Gubler
Graduate 1949, United States Air Force Institute of Technology
Linda Diane Henderson
B.S. 1944, University of Maryland
Edward David Houser, Jr.
B.S. 1944, University of Maryland
Vernon Armstrong Leach
B.S. 1944, Connecticut University
William John Latham
A.B. 1946, Gettysburg College
Joseph Martin Jones
B.S. 1946, Mississippi State College
Donald Knudsen
B.S. 1946, West Texas State College
James Lake
B.S. 1946, University of Maryland
Don Raymond Housh
B.S. 1946, Ohio State University
Walter James McNair, Jr.
B.S. 1946, United States Naval Academy
Ralph Lewis Mendenhall
B.S. 1946, University of Southern California
Lester Wilson Merrill
B.B.A. 1949, College of the City of New York
John Leonard Neill
B.S. 1949, St. John's University
William Howard Parkins
B.S. 1944, University of Maryland

Calif.

Md.

Kans.

Miss.

Pa.

Va.

N.J.

Miss.

Calif.

D.C.

Calif.

N.Y.

Calif.

Calif.

Degrees Conferred

445

Russell Thomas Pratt B.S. 1944, United States Naval Academy	Ill.	Andrew John Rouns B.S. 1948, Indiana State University	Ind.
B. F. 1948, M.C.E. 1948, Rensselaer Polytechnic Institute		Paul Joseph Schuler Graduate, U.S. United States Air Force Academy of Technology	Pa.
John John Rouns A.B. 1947, University of Pittsburgh	Pa.	John James Stephens A.B. 1947, The George Washington University	Ill.
Charles William Rouns B.S. 1947, United States Naval Academy	Ill.	Charles William Stephens A.B. 1947, West Virginia Wesleyan College	W.Va.
William Lewis Roe, Jr. B.S. 1944, University of Maryland	Mo.	Marion Eugene Wagner B.S. 1948, Wayne University	Mo.
Raymond Robert B.S. 1944, University of Maryland	Ga.	Charles Henry Winkler B.S. 1948, University of Maryland	Pa.
Charles William Rouns B.S. 1944, University of Maryland	Major	Stanley Norman Winkler B.S. 1948, University of Maryland	Pa.
Harold Paul Rouns B.S. 1944, University of Texas	W.V.	Henry Edward Wood A.B. 1947, The George Washington University	D.C.
Robert Maxwell Rouns B.S. 1944, University of Idaho	Wash.	Frederick Stephen Wood A.B. 1948, Colby College	Mass.
William Matthew Rouns B.S. 1948, University of Maryland	Mass.		

COLLEGE OF GENERAL STUDIES

ASSOCIATE IN ARTS

NOVEMBER 11, 1954

Va. Thomas Oliver Kline Va.

FEBRUARY 22, 1955

Conrad Herbert Nigle Va.

JUNE 8, 1955

Pa. Stanley Vincent Johnson Va.
Texas Dallas Ernest Strickland Kansas

BACHELOR OF ARTS

NOVEMBER 11, 1954

Carl Fitch Dewaldie Tenn.

FEBRUARY 22, 1955

Md. Joseph Matthews Jones N.Y.

JUNE 8, 1955

Ohio Stanley Corvett Lewis Minn.

MASTER OF ARTS

NOVEMBER 11, 1954

David Francis Riva Conn.
B.S. 1948, Springfield College

FEBRUARY 22, 1955

Va. William Edward Colvin Iowa
B.S. 1951, Northwestern University

Robert Thomas Pratt
B.S. 1944, United States Naval Academy
B. F. 1948, M.C.E. 1948, Rensselaer Polytechnic Institute
John John Rouns
A.B. 1947, University of Pittsburgh
Charles William Rouns
B.S. 1947, United States Naval Academy
William Lewis Roe, Jr.
B.S. 1944, University of Maryland
Raymond Robert
B.S. 1944, University of Maryland
Charles William Rouns
B.S. 1944, University of Maryland
Harold Paul Rouns
B.S. 1944, University of Texas
Robert Maxwell Rouns
B.S. 1944, University of Idaho
William Matthew Rouns
B.S. 1948, University of Maryland

Andrew John Rouns
B.S. 1948, Indiana State University
Paul Joseph Schuler
Graduate, U.S. United States Air Force Academy of Technology
John James Stephens
A.B. 1947, The George Washington University
Charles William Stephens
A.B. 1947, West Virginia Wesleyan College
Marion Eugene Wagner
B.S. 1948, Wayne University
Charles Henry Winkler
B.S. 1948, University of Maryland
Stanley Norman Winkler
B.S. 1948, University of Maryland
Henry Edward Wood
A.B. 1947, The George Washington University
Frederick Stephen Wood
A.B. 1948, Colby College

Thomas Maurice Gollenwater

James McRae Bolinsky
Graduate, Eastern College

Donald Melvin Honeywell

Theodore Lewis Cooper
Rensselaer Polytechnic Institute

Harry Clinton Clay, Sr.
A.B. 1947, The George Washington University

JUNE 8, 1955

Roger Tucker Abbott B.S. 1946, Harvard University M.S. 1948, The George Washington University Dissertation, "The Geographical Genes Common to the Bluetongue"	Pa.	John Whitfield Kesteven A.B. 1917, A.M. 1920, University of North Carolina Dissertation, "The Mammals and Management of Swampy Prairie Land"	N.Y.
LeVonne Bowers A.B. 1939, University of Minnesota A.M. in Geol. 1941, The George Washington University Dissertation, "Ferguson River and River, the Eastern Development and Association to Life"	Va.	James Joseph Michals A.B. 1941, University of Delaware M.S. 1948, The George Washington University Dissertation, "A Study in the Geol- ogical Structure of Selected Strata of Eastern America"	Conn.
William James Connolly B.S. 1941, Fordham University M.S. 1947, The George Washington University Dissertation, "Methods for the Inter- pretation and Interpretation of Quaternary Soil Series in the Region of Maryland with Bond and Pro- cess"	N.Y.	Elizabeth Janet Oswald B.S. 1933, University of Missouri M.S. 1947, The George Washington University Dissertation, "Archaeological Research in Mississippi, Pennsylvania and in Re- lation to the Plains, Two Eastern Regions"	Vt.
Nathan F. Galloway A.B. 1941, A.M. 1943, Columbia University Dissertation, "General Points in the Lithological Stratigraphy of Cuba"	Md.	Lloyd Emerson Wagoner B.S. 1940, Louisiana, (Louisiana) University M.S. 1947, The George Washington University Dissertation, "The Effects of Human and Climate on the Geology of the Geological Field, Tennessee the Lake"	Vt.
Harold Lee Hargrove A.B. 1941, University of the City of New York A.M. 1942, New York University Dissertation, "An Investigation of the Role of the and Geology, Explan- ation in Supervisory Relations"	Texas		

RECIPIENTS OF AWARDS

SCHOLARSHIPS

1954-55

- The Alpha Zeta Omega Scholarship:* Barry Howard Deutschman
The Alumni Scholarship: Richard Julius Jamborsky
The American Foundation for Pharmaceutical Education Scholarships: Gust George Koutsos, Louis August Koutsos, Philip Lazzaroff, Samuel Rudolph
The American Society of Women Accountants, District of Columbia Chapter, Scholarships: Betty Mae Maxwell
The Byron Andrew Scholarship: Marilyn Joan Tate
The Anna Bartok Scholarship: Kathryn Anne Williams
The Emma K. Carr Scholarships: John Allen Arness, Arnold Benjamin Bart, John Ulrich Buchanan, John Vincent Carfield, Harold Leopold Flood, James Walter Gadden, Gene Donald Hines, Ward Ballard Hurst, Gust George Koutsos, Philip Lazzaroff, Richard Joseph Siedel, John Louis Tenenb, William Thompson, Jr., Robert Howard Van Sicken, Leonard Irving Weinman
The Marie M. Carter Scholarship: Christopher Kingsley Brown
The Chi Omega Scholarship: Marlon Elmer Mulvaney, Duane
The Daughters of the American Revolution Scholarship: Mary Joan Duke
The Delta Delta Scholarship: Gayla Oona Aydt
The District of Columbia Pharmaceutical Association Scholarships: William Russell Castle (fall term)
The Charles H. Houghton Daring Scholarship: James Forbes Menow
The School of Engineering Scholarships: Gene Gordon Exant (fall term), James Alfred Perschy, William Stuart Rausby, Garthwin Hunt Taylor
The Robert Farnham Scholarship: Donna Ruth Schott (fall term)
The Anna Spicker Hempel Scholarship: Claudia Sarah Howell
The Emma Louis Harvey Scholarship: Susan Olen Hayman
The Little S. Hamilton Scholarship: Margaret Graham Bulek
The High School Scholarships: Beverly Jane Alexander, Walter Lawrence Bannister, Carolyn Schmitt Berk, Doris Ann Davis, Charles Gary Fagan, Edgar L. Fehren, Park William Farnschade, Jr., John George Fletcher, Karen Marie Flood, James Morris Gaudreau, Jerry Marie Gray, Gary Edward Gomer, Ruth Ann Grooms, Ronald Hank, Jr., Ann Henry, Monte Arnold Henson, William Randolph Hix, Mary Elizabeth Hoffman, Eugene Gary Homewitz, Richard Scott Hodgins, Robert Harold Humphreys, Samuel Jay Koyser, Louise Alice Krue, Shirley Ann Lander, Ronald Charles Latman, Solvay Laurence, Robert Paw Meyers, Paul Frank Meyers, Judith Rachel Maffett, Robert Hugh Moore, Frank Joseph Nae, John David Oberholzer, David Mervyn Perkins, Carol Landis Pictus, Terren Francis Piver, Ellen Teresa Riley, Leontia Mia Reeves, Ann Madison Reid, Mary Carolyn Rowe, Edward Michael Saechet, Frederic Barrie Sax, Eva Lee Schoedel, Ernest Richard Shaffer, Mary Susan Smeulaker, Roger Earl Springer, Barbara Lynn Stuart, Anna Margaret Swenson, Valery Thomson, Bernhardt Rayley Tittman, Harold Lee Tuckman, Rita Gayla Tucker, Goldie Anneta Weiss, Rosa Dahl Wiener, Ann Merxan Williams, Gilda Joyce Winesap, Carol Evelyn Woodruff
The High School Division Conference Scholarship: Eugene Isaak Lambert
The Kappa Alpha Theta Scholarship: Marietta Hawes Schneider

- The Kappa Psi Scholarship:* Archie Lee Smith
- The Lane School Scholarship:* Reed Amussen Benson (spring term), Russell Edwin Carlisle, Robert Patrick Casey, James Wesley Crowther, William John Driscoll, Homer Mark Jensen, Ronald Earl MacIsen, Charles Ann McLean, Edwin John Monahan, Claron Chapman Spence, John Walter Vardelin, Ewell Gene Wade, Francis Joseph Wilson, Raymond Warren Young
- The Eugene and Agnes E. Meyer Scholarships:* Alvin Thayer Crayens, Patricia Jeanne Culley, Paul Grosvenor Douglas (spring term), John Edward Duncan, Donald Raymond Halford, George Webster Latimer, Jr., Agnesdine Mayhew (spring term), Ann Tuzicko Marayama, Sarah Jean Parker, Dora Maria Toranzo, Fred Brownell Tomlinson, Otto Herman Ulrich, Jr., Leo Bryant Van Herpe, Elizabeth Lynn Weber, Barbara Elaine Wollin
- The A. Marchmont Scholarship:* Henry Earl McLane, Jr.
- The National League of Manufacturers Scholarship:* Ronald Joseph Krausdorf
- The Newspaper Scholarships:*
- The Evening Star:* Bernard Arthur Goodrich, Hugh Logan Newell
- The Washington Post and Times Herald:* Arthur James Conlan (spring term), Mary Nell G. G. G. G.
- The Pantheonic Association of Washington, D. C. Scholarship:* Virginia Donald Lott
- The Paul Pearson Scholarship:* Paul Wayne Chasler
- The John O. Runkin Scholarship:* Henry Dawson Wells, Jr. (fall term)
- The Lulu M. Shepard Scholarship:* Barbara Silas Harvey, Carmel Martha Jones
- The David Spencer Scholarship:* Otis Eugene Keer
- The Mary Louise Stone Scholarship:* Louise Abbot Austin
- The Student Activities Scholarship:* David Albert Williams Dale Ames, Claude Be Austin, George Bruce Bart, Andrew Lewis Baker, Aris Woodard Barr, Steven Bank, William John Berry, Joseph Francis Boland, Michael Eugene Brown, Orla Gilbert Brinkhoff, John Daniel Buckingham, Evelyn Alexander Cannon, Leonard Francis Connick, Richard Charles Coyne, Basil Joseph Craig, James S. Clark, Richard Clayton Cusack, Robert Lee Cusack, Vase Ray Conrad, Frank Edward Costello, John Joseph Daly, Gene D'Arbino, George Davis, Robert Earl Doss, Walter James Dwyer, Louis John Dwyer, Jr., John James Dwyer, Howard Eugene Frank, Frank Wallace Johnson, Furr, Richard Milton Gault, Richard Joseph Gault, Robert Parker Gault, Robert William Gault, Richard Joseph Gault, Robert Henry Hazen, John Francis Hazen, David Mawson Hill, Joseph Francis Hise, John Oscar Hindaw, Kenneth Hise, Herbert Jack Hoff, James Anthony Hogue, John Frank Hogue, Joseph John Hogue, Robert Anthony Jarrow, John Gilbert Jolly, Elmer Kiefer, Jack Edward Kewick, George John Patrick Kline, Henry Patrick Kline, Bernard Conrad Kuyak, Louis William Kuyak, Gerald Mathew LeCompte, David LeRay Liddick, Robert William Lloyd, Ray Michael Luster, James Robert Luster, James Edward Manning, James Raymond Marshall, William Patke M. Henry, Jr., Erwin Morke, Francis Eugene Moser, Ray William Murray, Nathan James Niddle, William Alfred Noel, John Joseph Nollan, Augustine Orta, Jr., Gerald Joseph Petracchi, James Howard Peake, Theodore Barker Poston, Joseph Francis Petracchi, Harry Pitt, John Joseph Post, John Stanley Price, Kenneth Ramon-Carrion, Herbert Ray Rejaport, Robert David Reid, Wayne Joseph Rick, Jack Rutenhouse, Joseph Anthony Rosano, Edward Steven Rutch, John Franklin Seifer, Edward Charles Schuch, Irving Sany, Albert John Schaefer, George Edward Semkew, Robert Joseph Stuba, Edward Monte Stuba, George Andrew Schuk, Alvin Lee Solomon, Michael Samuel Sommer, Lawrence William Spellman, Peter James Spera, Bernard Charles Steiner,

Robert Lee Sturm, Robert Gerald Sutton, Robert Lawrence Sweeney, Myron Paul Thompson, William David Tomaykowski, Arnold Jay Tranen, Roger Wickensham Turner, John Richard Vane, Ada Vase, Orville Way Vasey, James Henry Wagner, Stanley Walowac, James Henry Weaver, Charles Ray Williams, William Raymond Wortham II, Vernon Wesley Yates, Richard Wayne Young, John James Ziamandanis, Albert Roy Zippay, David Homer Zuker, Donald Michael Zuker.

The Charles Canton Sinker Scholarship. Karin Winroth
The William Walker Scholarship. Henry Earl McLane, Jr.
The John Withington Scholarship. Nancy Lee Ruaker
The Leon Withiam Scholarship. Joseph Henry Kullback
The Zonta Club Scholarship. Brigitte Klara Buchmann

PRIZES

1954-55

Alpha Chi Sigma Freshman Award in Chemistry. Park William Eppenschade, Jr.
David Maxwell Perkins. Lem Gilbert Sauer
Alpha Chi Sigma Senior Award in Chemistry. Carolyn Schuman Berk
Alpha Delta Pi Award in Scholarship and Leadership. Barbara Sidley Harvey
Alpha Kappa Psi Award in Commerce. Marvin Bruce McDonald
Alpha Zeta Omega Award in Pharmacy. Susan Mary Penette Egan
American Institute of Chemistry Award in Chemistry. Carolyn Schuman Berk
James Thurston Burns Award in Organic Chemistry. George Webster Latimer, Jr.
Morton L. Cantow Memorial Award in Pharmacy. Marvin Schaeffer
Civ Group Award in Social Science. Ann Margaret Reid
John Henry Gandy Award in Government. Barbara Lewis Watson, Jan Philip Campbell
Dorot Center Grant Award for an essay on drama or the theater. Susan Jay Kayser
E. K. Culler Award in English. Patsy Ruff Sumner
Leon Davis Award in Public Speaking. Est. Kenneth Moore, George Webster Latimer, Jr., Neil Michael Winkler
Delta Zeta Award in Zoology. Ronald Gordon Latimer
Emmett Award in Public Law. William Wade Buckner
Epsilon Award in Greek. Joseph Robert Mullan
Justin Davis III Memorial Award to that man in the graduating class who has demonstrated his special ability in the moral and cultural sciences and who has given promise of the interpretation of that ability in some responsible manner of culture. Arnold James Rabin
Walter E. Fries Award in Chemistry. Howard Leslie Birch
John Douglas Gilmour Award in American Literature. Joe Franklin Nantz
Lawrence Corporation Goodard Award in French. Irving Louis Noll
James Douglas Goodard Award in Pharmacy. Paul Schaeffer
Marvin Buchanan Goodard Award in Commerce. Marvin Bruce McDonald
Goodard G. Hubbard Memorial Award in Social Science. History: Carolyn McWilliams, Ann Margaret Reid, Doris Ruth Schaeffer
Kappa Kappa Gamma Award in Business. Carol Annette Linn
John Will Vasey Award to that member of the graduating class who has shown the highest scholastic standing. Carolyn Schuman Berk
Morton Maltby Award in Mathematics. John Howard Brinkley
Meyer Award Award to the man or woman in the Scholarship Club (senior) who has shown the highest ability and the most meritorious record in a field of his or her choice.

Omicron Delta Kappa Award to that member of the Senior Class who, throughout his course, has done the most constructive work in student activities:
 Howard Richard Roberts
John O'Brien Award to the students in the Law School who have attained the highest average grades in the first year and second year full-time courses:
 Ronald Allen Rattl, Charles Frank W. Gaylor (1953-54)
John O'Brien Award to that member of the graduating class of the School of Medicine with the highest scholastic standing: Virginia Ann Dwyer
Pan Ets Sigma Award to the beginning male student attaining the highest scholastic standing in his first full term of work: Marvin Victor Simon
Pan Sigma Kappa Award to the winner in a freshman oration contest: Richard James Lindbergh
Pi Beta Phi Award to that member of the Senior Class who, throughout his career, has done the most to promote student activities: Andrew Manning
Pi Chi Award in Psychology: James Kenneth Armon, Suzanne Dwyer Hill
Pi Chi Award in Mathematics: John George Feltzer
Sigma Kappa Award in Chemistry: Edmund Allaway
James McBrat Stewart, Jr. Award in Physics: Irvin Henry Schuck
Washington Personnel Association Award for attainment in the field of Business Administration: Mary Ellen Rose

STUDENT ASSISTANTS

JUNE 1, 1954 TO JUNE 1, 1955

Accounting: Gerald Aronson, Charles Edgar Campbell, Frederick Lester Collins
Business Administration: James Van Arman, Kenneth Jensen, Paul Lewis, Maryn V. Jones, Barbara Lynn Watson
Chemistry: E. Lee Schuchel
Civil Engineering: Byron Layton Butler, Mable Haggard Council, Lucile Eugene Hunter
Electrical Engineering: Edna Kline (MSE), Robert Sanford Ransom, Eugene Olinde Sykes
Education: Edward Hendricks (AB), Laverne Helen Richardson, Walter Allen Stephens, Roy Henry Whitford
English: Jeanne Johnston, Robert Lyman Carter, Harry Rowe Hunter, Robert Vincent McGraw
Geology: Arnold Benjamin Barr, Ronald Jack Bartrick, Marvin Wakefield Fisher
Health Education: Cary Jack Nourse
History: Perry Andrus, Basil Butcher, Melvin Michael Brady, William George Linn, Donald Gilbert Farnsworth, Jr., Alvin George Gossard, Edward Stuart Ross, Dorothy Anne Leonard, James Franklin Semmes, Jr., Arthur Paul Savage, Harold Stewart, Richard Albert Strick, John Stacy, Lee Stanley Strong
Industrial Engineering: Lucile Ann Baskin, Sally Jack Meyer
Law: Walter Lawrence Bechtel, Lawrence Anne Emery, John Joseph Hild, Charles Philip Kibby (AB), Marvin Lee Phillips, Thelma Palmer, Charles Foster Seeger, Howard Francis Thomas, Jane Whittemore
Literature: Phyllis Lee Bachman (LL.B.), Ruby Evelyn Hart
Mathematics: Anne Bell, Charles Allen Coffey, Mary Verablin Price
Natural Science: Melvin Michael Brady, Harry Marvin Brandler, Just Love
Philosophy: Martin Henry Buckhardt Price, Jr.
Political Science: Marie Elizabeth Baskin, Mary Jean Hensle, Arvidal Jensen
Public Administration: Albert (AB)

History: Richard Johnson Hunt, Thomas Lab Leavens, Carroll McKellogg, Ann Madison Reid, Deena Ruth Scharr, Nancy Horton Walask, Elizabeth Trimmer Wright (A.B.)

Jouralism: Frances Josephine Lauer, Jo Ann Muir

Mechanical Engineering: Harry Marvin Brandler, Kenneth Wayne Scott, Robert Howard van Sickle

Pharmacy: Raymond Blacker, Gust George Kautenik, Marvin Philip Siskin, James Henry Wood

Physical Education for Men: James Merwyn Hill, Edward Lawrence Jaffe, Andrew Charles Kalon, Jr., Chasum M. Avey, Shirley Patricia Reed, Jean Anne Todd, Jr.

Physics: John George Fletcher, Susan Lynn Lauer, Emily Schultz McGee, George David Murray, John David Oberholzer, David Memorial Perkins, Robert Lee Uphoff

Political Science: Arthur Sparrowa Bucks (A.B.), Charles Reed Bryant (A.B.), John Wm Kieker (A.M.), Bradford William Miller, Jr., Sarah Jean Purser, Gordon Silberman Thacher

Psychology: Linda Iris Baker, Paul Stanley Burns, Barbara Ann Cusley, Donald Raymond Haffel, Patricia Kaptelin, Mary Lane Marshall, E. Katherine Lee M'Vey, Clara Penaty Ransfield, Ann Newman Sanders, Robert Henry Thacker, Janet Reed Vincent

Romance Languages: Lydia Lawrence Fries

Sociology: M'Vey Anne Hedford

Speech: Linda Leighton Carr, Eugene Isaac Lambert, Barbara Sinclair Schaefer, Miss Dahl Weller

Statistics: George Burton, Jr. (B.S.), Rose W. Burton (A.B.), Donald Raymond Haffel, Arthur David Kieker, Kenneth Freeman Mosman (A.M.), Howard Robert, Raymond Edward Thomas

Zoology: Murray Fredrick Hassenman, William Jack Holliman, Jr., Wood Belmont Harburt, Peter John Kyne, Richard James Low, Luis Raul Otten, Ivan Bernard Simmon, Larry Bernard Silver, Ann Brown Simpson

STUDENTS REGISTERED

SUMMER TERM 1954

FALL AND SPRING TERMS 1954-55

[illegible]

Arnell, Edward Orin (L)	Wis.	Arness, John Allan (M)	Wis.
B.S. A.B. 1948, University of Wisconsin		A.B. 1948, The George Washington University	
Arner, Bernard	D.C.	Arnett, Marie Mawka	
Arner, Robert James	D.C.	A.B. 1941, Ed. 1945, Morehead State College	
Arner, Louise Alberta	Pa.		
	D.C.	A.M. 1941, Ed. 1951, The George Washington University	
Arner, Clara Ramsey, Jr.	Va.		
B.S. 1941, University of Maryland		Arns, Gordon Louise	
M.S. 1943, Rutgers University		Arnold, James Robert	
Arnsperg, Robert Joseph	Texas	Arnold, Margretta	
Arnsperg, Louis Elmore	D.C.	Arnold, Margaret Faint	
	N.Y.	Arnold, Paul Eugene	
Arnsperg, Marvin M.		B.S. 1941, Kansas State College	
B.S. 1944, A.M. 1949, New York University		Arns, Paul Elmer	
Arnsperg, Henry Joseph		Arns, Mary Louise	
Arnsperg, Albert D.	Wash.	Arns, Ralph Donald	
Arnsperg, Nellie Mary	D.C.	Arnsperg, John Sander (L)	
Arnsperg, Marvin	D.C.	Arnsperg, Corbin Ray	
Arnsperg, Albert Henry	D.C.	Arnsperg, Leonard Mae	
Arnsperg, Joseph Ronald	Pa.	Arnsperg, Bernad	
B.F. 1941, Pennsylvania State University		B.S. 1941, College of the City of New York	
Arnsperg, Eugene, Wisconsin			
Arnsperg, Helen Elizabeth	D.C.	Arnsperg, Alma Aylene	
Arnsperg, Jacob D.	N.M.	Arnsperg, Nolan Payne	
Arnsperg, Lila Mabel (L)	D.C.	A.B. 1938, Youngburg College	
A.B. 1941, University of Maine		Arnsperg, Paul Thomas (L)	
Arnsperg, Anne Janet	MI	B.F. 1941, Marquette University	
A.B. 1941, University of Maryland		M.F. 1941, Harvard University	
Arnsperg, William York (M)	Calif.	Arnsperg, Frank	
A.B. 1941, University of California		Arnsperg, David	
Arnsperg, William Gordon	D.C.	B.B.A. 1941, New Mexico College of Agriculture and Mechanic Arts	
Arnsperg, Gerald Oswald	D.C.		
Arnsperg, Michael	D.C.	Arnsperg, Howard Robert	
Arnsperg, Ronald Alan (M)	D.C.	Arnsperg, John Joseph	
Arnsperg, Raymond Vincent	Va.	A.B. 1941, The George Washington University	
B.S. 1941, U.S. Military Academy		Arnsperg, James Nicholas	
Arnsperg, William Gordon, Jr. (L)	Pa.	Arnsperg, Maude Eleanor	
B.S. 1941, Syracuse University		B.S. A.B. 1945, Lindenwood College in Wisconsin	
Arnsperg, Stanley	Va.	A.M. 1945, Columbia University	
Arnsperg, John Martin	D.C.	Arnsperg, William	
Arnsperg, Louise Mary	N.Y.	A.B. 1941, St. John's College	
Arnsperg, Anne Elizabeth	Pa.	A.M. 1941, University of Maryland	
Arnsperg, Bruce Henry	Md.	Arnsperg, Walter Little	
A.B. 1941, Washington Missionary College		A.B. 1941, The George Washington University	
Arnsperg, Dometrie Archie	George	Arnsperg, John Carol (L)	
Arnsperg, James Kenneth	Calif.	A.B. 1941, West Virginia University	
A.B. 1941, University of California at Los Angeles		Arnsperg, Ruth Ann	
Arnsperg, Gerald	Pa.	Arnsperg, Geraldine Ramona	
A.B. 1941, The George Washington University		Arnsperg, Gladys Beverly	
		A.B. 1945, A.M. 1948, University of Kentucky	
Arnsperg, Ronald Anthony	N.Y.	Arnsperg, Ruth William	
Arnsperg, William Rollin	Va.	A.B. 1941, University of Colorado	
Arnsperg, James Paul	Md.	Arnsperg, Alexander Alexander	
Arnsperg, Mary Ann	D.C.	Arnsperg, William Preston	
Arnsperg, Sidney Lee	N.Y.	Arnsperg, Charles David (L)	
A.B. 1941, Brooklyn College		A.B. 1941, University of Missouri	
Arnsperg, Thane Frederick	Va.	Arnsperg, Gary Herman	
Arnsperg, Eugene	N.Y.	Arnsperg, John	
A.B. 1941, Fairleigh College		A.B. 1941, North Carolina State College	
A.M. 1941, Fairleigh College			
Arnsperg, John Benjamin	N.Y.	A.M. 1941, The George Washington University	
B.S. 1941, Rutgers State College		Arnsperg, Paul Johnson	
Arnsperg, Maria Emma	Md.	A.B. 1941, Northwestern Presbyterian University, Tenn.	
A.B. 1941, Western College			
Arnsperg, Mary Jane	D.C.		
Arnsperg, Blanche Charles	Md.		
B.S. 1941, University of North Dakota			
Arnsperg, Royal Bryant	Md.		

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Baxter, Charles Sayre, Jr.	D.C.	Beck, Thaddeus Edmund, Jr.	Va.
Baxter, David James	MI.	A.B. 1952, Princeton University	N.Y.
A.B. 1947, St. John's University		Becker, A. Gene Benson	Texas
Baxter, Hiram Hardy	MI.	Becker, Charles	
A.B. 1944, University of Maryland		B.S. 1944, U. S. Naval Academy	
Baxter, Ronald Henry	MI.	M.B.A. 1951, Harvard University	Va.
Bay, John H.	D.C.	Becker, Earl Carlisle	MI.
Bayless, Edward Thomas	Va.	Becker, Earl Franklin, Jr.	
B.S. 1924, University of Maryland		B.S. 1925, Manhattan College	Iowa
Bayes, Frederick Merkle	Fla.	Becker, John Bennett	
B.S. 1943, University of Miami		B.S. 1944, Iowa State College of	
M.S. 1944, The George Washington		Agriculture and Mechanic Arts	Fla.
University		Becker, William Wade (Jr.)	
Bayne, Robert Ferdinand	MI.	B.S.E. 1948, The Citadel	N.Y.
Bayne, Harold Eugene	D.C.	Becker, Daniel Webster, Jr.	D.C.
Bayless, Selma Florence	D.C.	Beckman, Carley Jay	Mass.
Bayne, Elmer	Va.	Beckman, Helen Violet	I.
Bayne, Edgar Guy	IL.	Beckman, Kenneth Lee	MI.
Bayne, David Jerome	D.C.	Beckman, Victor Rudolph (Jr.)	
Bayne, Robert Andrew (M)	MI.	B.S. 1942, University of Wisconsin	N.J.
B.S. 1941, University of Maryland		Beckman, Arthur Henry	
Beach, Stephen Harrison	IL.	A.B. 1952, Columbia College, Ill.	MI.
B.S. 1929, Iowa State College		Beckwith, Milton Cress	
Beacham, Joe Nathaniel	Va.	A.B. 1948, Rhode Island School of	
A.B. 1947, The George Washington		Education	
University		A.M. in Ed. 1951, The George	
Beach, Lee Murray	MI.	Washington University	MI.
Beach, Nancy Bradford	I.	Beckwith, Ronald Jean	
Beach, Thomas Paul (Jr.)	MI.	A.B. 1949, Washington Massachusetts	
B.M.E. 1949, U. S. State College		College	MI.
Beach, Alan McKee	Va.	Beckwith, Charles Nancy	Calif.
B.S. 1951, Pennsylvania State		Beckwith, James Eugene, Jr. (M)	D.C.
University College, Carlisle		Beckwith, F. John	N.Y.
Beach, David Eugene (Jr.)	D.C.	Beckwith, Mary Eileen	Va.
B.S. 1948, University of Utah		Beckwith, Thomas Howard	
Beach, William Gordon, Jr.	Mass.	Beckwith, Robert Lloyd	Fla.
B.S. in E.E. 1951, Georgetown		A.B. 1942, Michigan State College	
University		Beckwith, Robert (Jr.)	
Beach, Evelyn Howard	Va.	A.B. 1942, Cornell College	I.
Beach, Franklin David (M)	Va.	A.M. 1947, Clark University	Va.
B.E.E. 1942, Iowa University		Beckwith, William Frederick	
Beach, Alan M.	Va.	Beckwith, Edward H.	
Beach, Edward Martin	Texas	B.S. 1941, Kansas State College of	
Beach, Edward Martin	D.C.	Agriculture and Allied Science	I.
Beach, Edward Paul		Beckwith, Margaret	Mass.
B.S. 1944, U. S. Naval Academy		Beckwith, Augusta Moulton	
Beach, Ernest John	Va.	Beckwith, Charles Frank (M)	D.C.
Beach, John Van Orman	Va.	A.B. 1950, Minnesota State University	
Beach, Richard Woodard	Va.	Beckwith, Charles Eugene	D.C.
Beach, John	D.C.	B.S. 1947, University of North Carolina	D.C.
Beach, George Clayton	Va.	Beckwith, John M.	D.C.
Beach, Mary H. Hancock	D.C.	Beckwith, Norman (Jr.)	
A.B. 1951, The George Washington		Beckwith, Richard Blaine	Va.
University		A.B. 1949, Indiana College	
Beach, Margaret Ann	Mass.	Beckwith, Paul Allen, Jr.	D.C.
B.E.E. 1951, Boston University		B.E.E. 1947, Ohio State University	D.C.
Beach, Alfred Joseph	Fla.	Beckwith, Robert Allen	MI.
Beach, Joseph Joseph	Va.	Beckwith, Robert Allen	Va.
A.B. 1948, University of Vermont		Beckwith, Robert Allen	Va.
Beach, John George Thomas (Jr.)	D.C.	Beckwith, Robert Allen	MI.
A.B. 1947, University of the South		Beckwith, Robert Allen	MI.
Beach, James Oswald	Va.	Beckwith, Robert Allen	MI.
Beach, Arthur Randolph	D.C.	Beckwith, Robert Allen	MI.
Beach, Charles Foster	Pa.	Beckwith, Robert Allen	MI.
Beach, Gene Allen (Jr.)	Kans.	Beckwith, Robert Allen	MI.
B.S. 1944, Marquette College		Beckwith, Robert Allen	MI.
Beach, Charles Joseph	MI.	Beckwith, Robert Allen	MI.
B.S. 1950, The George Washington		Beckwith, Robert Allen	MI.
University		Beckwith, Robert Allen	MI.
Beach, Harold Russell (Jr.)	Ohio	Beckwith, Robert Allen	MI.
B.S. 1946, Case Institute of Technology		Beckwith, Robert Allen	MI.
Beach, Henry David	D.C.	Beckwith, Robert Allen	MI.
Beach, John James	D.C.	Beckwith, Robert Allen	MI.
Beach, Robert Joseph	D.C.	Beckwith, Robert Allen	MI.

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Brown, Chrl Irene	Va.	Bryant, Charles Reed	Mo
B.S. 1939, Northwestern University		A.B. 1939, A.M. 1950, George	
A.M. 1950, The George Washington		Peabody College for Teachers	Pa
University		Bryant, Joseph Franklin	
Brown, Patricia Marie	N.J.	B.I.E. 1957, Georgia Institute of	
Brown, Patricia Joseph	D.C.	Technology	Mo
Brown, Ronald Leamon	Va.	Bryant, Ralph Lee	
Brown, Robert Leamon	D.C.	B.S. 1947, Missouri University	D.C.
A.M. 1950, George Peabody College		Bryant, Robert Stuart (M)	
Teachers		A.B. 1944, The George Washington	
Brown, Samuel Hutton	Md.	University	Cal
Brown, George Fay	Mo	Bryant, Wilson Warner	
Brown, Nathan	D.C.	A.B. 1941, Stanford University	
Brown, Thomas Albert (L)	N.I.	M.B. 1944, Ohio State College	N.Y.
A.B. 1944, The George Washington		Buck, Richard Hays (L)	
University		B.C.E. 1944, Jackson College	Md.
Brown, Verly Elizabeth	Va.	Buck, Leonard Anthony	
Brown, Walter Lee	Mo	Buckner, Jean Nelson	
Brown, William Leelan III	D.C.	B.S. 1957, Russell Sage College	D.C.
Brown, William Eugene	D.C.	Burkhead, Edward Wilson	Mo
Brown, William Garrison	D.C.	Burkman, Eugene Kline (M)	
Brown, William Stuart (L)	D.C.	A.B. 1944, The George Washington	
B.S. 1949, M.S. 1952, Iowa State		University	Mo
College		Burman, John Ulrich	D.C.
Brown, William Theodore	Va.	Burman, Anne Regina	Va.
Brown, William Joseph	Va.	Burk, Donald Alden	D.C.
Brown, Anna Mae	Md.	Burk, Robert Max	
A.B. 1937, American University		B.S. 1944, Worcester Polytechnic	
A.B. 1948, Shepherd College		Institute	D.C.
Brown, David Edson	Va.	Burkstein, Donald Gregory	D.C.
B.I.E. 1947, University of South		Burkstein, John James	W.Va.
Carolina		Burke, David Thomas	N.H.
Brown, Milton Ronald	Md.	Burney, James Joseph (L)	
Brown, Patricia	D.C.	A.B. 1941, St. Anselm's College	Conn.
Brown, Richard Allen	D.C.	Burney, Jean Thomas	
Brown, Joe Leon	Md.	A.B. 1941, University of Connecticut	D.
B.S. 1947, Marshall College		Burkey, Melvin William (L)	
Brown, John Thomas James	D.C.	B.I.E. 1946, Jackson College	Va.
Burr, James William	Va.	Burkey, Robert Paul (L)	
Burke, Daniel Lewis	Va.	B.S. 1947, The George Washington	
A.B. 1948, University of Wisconsin		University	Tenn.
Burke, Jean Mary	Va.	Burkner, James Weldon (L)	
Burkner, Francis Charles	Md.	A.B. 1948, University of	
Burke, Albert Henry	D.C.	Tennessee	Va.
Burke, David Seneca	Md.	Burby, Joseph	
Burkholder, Dean E.	Va.	Budney, Leonard Joseph	Ga.
A.B. 1948, Georgetown University		B.R.A. 1952, Duquesne University	
Burnette, John Joseph Howard (L)	Va.	Burke, Paul Douglas	Ill.
B.I.E. 1950, Catholic University of		B.S. 1948, U.S. Naval Academy	
America		Burns, Mary Catherine	\$45.
Burns, Tully Emanuel Gentry	D.C.	A.P. 1947, University of Chicago	Mo
A.B. 1950, Harvard University		Burke, David Conway (L)	
A.M. 1954, Johns Hopkins University		Burke, Arthur Mervyn	
Burns, Bill Allen	Va.	A.B. 1946, The George Washington	
A.B. 1941, St. John's University		University	D.C.
Burns, Milton Lawrence (L)	Md.	Burke, Arthur Rose	D.C.
A.B. 1950, Trinity College		Burke, Arthur Marshall	Va.
A.M. 1951, Catholic University of		Burke, John Frank	W.Va.
America		Burke, Vincent Martha	Conn.
Burns, Gloria A.	Md.	Burns, John William (M)	Md.
Burns, Robert Joseph	Md.	Burns, Kenneth John	
Burns, Norman Jr.	Md.	Burns, Fitz R. Randolph	
B.S. 1941, University of Miami		A.B. 1947, New York State University	D.C.
L.B. 1947, L.L.M. 1952, Georgetown		Burns, Ross Richard	D.
University		Burns, Joseph Stanley	D.C.
Burns, Charles Edward	Va.	Burns, Joseph (L)	
Burns, Nina May Louise	D.C.	A.B. 1946, The George Washington	D.C.
Burns, Arnold Eugene	Va.	University	
B.S. 1947, The George Washington		Burns, Hugo Vincent	Pa.
University		A.B. 1942, University of Naples Italy	
Burns, Carolyn Nancy	D.C.	Burns, Ann	
Bryan, Robert Waitman	D.C.	A.B. 1950, Franklin and Marshall	
		College	

Students Registered

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Buran, David John (M)	Wa.	Buras, Paul	Miss.
A.B. 1925, Carleton College		A.B. 1926, The George Washington University	
Burke, Josephine Louise	Va.	Burke, Robert Henry	I.C.
Burke, Victor Louise	Fla.	Burke, Robert Howard	Va.
Burke, Thomas Robert	Md.	Burke, K. Lee	Md.
Burke, William Cary		A.B. 1925, Western College	
Burke, Thomas Martin		A.M. 1925, Tennessee University	
A.B. 1925, University of Maryland	D.C.	Burke, Thomas Lawrence	Va.
Burkholder, Patricia Ada	Md.	A.B. 1941, Carleton College	
Burke, Mary Ann	Md.	Burke, Peter Frederick	Va.
Burke, Paul Lewis	Md.	Burke, Thomas Louise	Va.
Burke, Harry Hamilton	Md.	Burke, Ray Martin	I.C.
Burke, Harry Frederick	Md.	Burke, William Charles	N.Y.
B.S. 1925, University of Maryland		Burke, William Frederick	Miss.
Burke, K. William Frederickson	Va.	A.E. 1934, University of Michigan	
Burke, Elizabeth Anne	Va.	M.F.A. 1935, Harvard University	
Burke, Arthur William	D.C.	Burke, John Ross	Miss.
Burke, Arthur Lewis (L)	D.C.	Burke, Mary Jones	Va.
B.M.E. 1925, The George Washington University		A.B. 1924, Iowa State University	
Burke, John Earle	Va.	A.M. 1925, Columbia University	
Burke, Robert O. Lawrence	Va.	Burke, Agnes	I.C.
Burke, William Ernest, Jr.	Md.	Burke, George	I.C.
Burke, Joseph Francis, Jr.	Pa.	Burke, George L.	N.Y.
B.B.A. 1924, St. Joseph's College		B.S. 1925, Virginia Polytechnic Institute	
Burke, Robert William (M)	Idaho	Burke, Irene Frances	Va.
B.S. 1924, Utah State College		Burke, John Mayne	Va.
Burke, Virginia Campbell		B.S. 1925, Northwestern University	
A.B. 1924, University of Tennessee	Va.	Burke, Joseph Chandler (L)	D.C.
Burke, Catherine Regina	D.C.	B.S. 1925, Alabama Polytechnic Institute	
A.B. 1925, Duke University	N.C.	J.D. 1925, University of Chicago	
Burke, Frances Frances		Ruston, Sarah Justine	I.C.
Burke, George Frederick	Md.	Burke, Margaret	I.C.
Burke, John Elmer	Ind.	Burwell, Grace Samons	Va.
A.B. 1924, Wesley College	D.C.	Burke, John Lester	I.C.
Burke, John Grant	Va.	Burke, Elizabeth Anne	I.C.
A.B. 1925, The George Washington University		A.B. 1925, The George Washington University	
Burke, Marian Josephine	Va.	Burke, Tom Porter (L)	Md.
A.B. 1924, Aquinas College		B.E.T. 1924, South Dakota School of Mines and Technology	
Burke, Mary Frances	W.Va.	Burke, Thomas Louise	I.C.
Burke, Patricia Jane	D.C.	Burke, William Leaver	Chas. City, Ohio
Burke, Patricia Michele	Va.	Burke, Margaret Geraldine	Md.
Burke, Jack Lewis	D.C.	Burke, Lucia Frank	Miss.
A.B. 1924, University of Miami		Burke, Richard Anne	
Burke, Margaret Skinner	Va.	A.B. 1924, Florida University	
B.S. 1924, Hampden Sydney College		Burke, Anne Annworth	I.C.
A.M. 1925, The George Washington University		Burke, David O.	Chas. City, Texas
Burke, John T. Ski	Miss.	Burke, John William	
Burke, John Richard	Md.	B.S. 1924, Stephen F. Austin State College	
Burke, Hubert Lee	Va.	Burke, Valeria Cecar	I.C.
Burke, Anne Russell	D.C.	Burke, Josephine Bowen	I.C.
A.B. 1925, Carleton College	Fla.	A.B. 1922, A.M. 1925, Howard University	
Burke, Thomas Anthony	Md.	Burke, Carl Oscar	N.Y.
Burke, James Anthony	D.C.	Burke, James Eugene Kenney	Va.
Burke, Joseph James	N.Y.	A.B. 1925, University of Virginia	
Burke, George James	Mass.	Burke, George	I.C.
Burke, Bill Hovle	Va.	Burke, James Jr. (M)	I.C.
Burke, Carl Ray (L)		B.S. 1925, Franklin and Marshall College	
A.B. 1924, Simpson College		Burke, John Edgar	I.C.
A.M. 1925, University of Iowa		Burke, John Lewis	Md.
Burke, Clara Louise	Md.	Burke, James Edward	I.C.
Burke, Thomas Theres	S.C.	B.M.E. 1925, Howard University	
Burke, Helen Stuart	Pa.	Burke, William J.	Va.
Burke, John Joseph	Calif.	Burke, Margaret Newman	Calif.
B.S. 1922, Pennsylvania State Teachers College		A.E. 1924, A.M. 1925, University of Chicago	
Burke, Laurette Frances (M)		Butler, Myrna	Va.
B.S. 1924, University of California			

Students Registered

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Students Registered

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[illegible]

Coffey, Kenneth Claude (M)	Coffey, Robert Norman	Coffey, Robert Norman	Va
A.B. 1927, University of Denver	A.B. 1927, Boston College	A.B. 1927, Boston College	
Coffey, Lawrence Robert	A.M. 1921, Fordham University	A.M. 1921, Fordham University	Mo
A.B. 1920, Albion College	Cook, Albert George	Cook, Albert George	Mo
Coffey, Francis Art	Cook, Andrew Hamilton	Cook, Andrew Hamilton	Va
Coffey, Ralph Wilson	Cook, Charles Douglas	Cook, Charles Douglas	
Coffey, Robert Ryan, Jr.	A.B. 1920, University of Buffalo	A.B. 1920, University of Buffalo	Kent
Coffey, Wallace Ledy	Cook, Charles Edwin	Cook, Charles Edwin	Ind
Coffey, James Paul	Cook, Charles William	Cook, Charles William	Ind
A.E. 1917, St. John's University	Cook, Francis Robert	Cook, Francis Robert	
Coffey, Robert Norman	A.P. 1912, The George Washington	A.P. 1912, The George Washington	
B.M.E. 1920, Purdue University	Cook, Francis Robert	Cook, Francis Robert	
Coffey, Paul Monroe	A.B. 1922, New York University	A.B. 1922, New York University	Ind
A.B. 1922, University of Illinois	Cook, Henry Aaron	Cook, Henry Aaron	Ind
A.B. 1922, Marquette College	Cook, James Allen	Cook, James Allen	
Coffey, William Ann	A.B. 1922, University of California	A.B. 1922, University of California	Ind
Coffey, Susan, Jr.	Cook, James Allen	Cook, James Allen	W. Va
A.E. 1912, St. John's University	Cook, John Henry	Cook, John Henry	Ind
Coffey, Edward George (M)	Cook, Leah Anne	Cook, Leah Anne	Va
A.B. 1919, Marquette College	Cook, Mary Katherine	Cook, Mary Katherine	
Coffey, Michael Ann	B.S. 1922, College of William and	B.S. 1922, College of William and	
A.B. 1919, Marquette College	Mary	Mary	
Coffey, Dudley Duane	M.S. 1922, The George Washington	M.S. 1922, The George Washington	
Coffey, Katherine Emma	University	University	Ind
A.M. 1919, University of Kentucky	Cook, Owen Eugene	Cook, Owen Eugene	N.Y.
Coffey, Katherine Emma	Cook, Richard Knapp	Cook, Richard Knapp	Ind
Coffey, Mary Emma	Cook, Sally Jo	Cook, Sally Jo	Va
A.E. 1919, Western College	Cook, Jane Lee	Cook, Jane Lee	Va
Coffey, Gustav Eugene	A.B. 1921, University of Arkansas	A.B. 1921, University of Arkansas	Kent
Coffey, Harvey Bailey (M)	Cook, Mary William	Cook, Mary William	
A.B. 1921, Ohio Wesleyan University	Cook, Law, Remick (L)	Cook, Law, Remick (L)	
Coffey, Irene William, Jr.	A.B. 1921, Municipal University of	A.B. 1921, Municipal University of	
Coffey, Jane Marie	Wichita	Wichita	Va
B.S. 1921, M.S. 1922, Oklahoma	Cook, Lawrence Allen	Cook, Lawrence Allen	Ind
Agribusiness and Mechanical College	Cook, Allen Benson	Cook, Allen Benson	Va
Coffey, Mary Katherine	Cook, Mary Kathryn	Cook, Mary Kathryn	
Coffey, Robert Lee	Cook, Edwin Ralph, Jr. (L)	Cook, Edwin Ralph, Jr. (L)	Ind
Coffey, Arthur James	B.S. 1922, University of Michigan	B.S. 1922, University of Michigan	Va
Coffey, Anna Louise	Cook, Robert R.	Cook, Robert R.	
B.S. 1922, California State Teachers	Cook, Charles Dean	Cook, Charles Dean	Mo
College	B.S. 1922, U.S. Naval Academy	B.S. 1922, U.S. Naval Academy	N.Y.
Coffey, Edward Ray	Cook, Eugene Martin (M)	Cook, Eugene Martin (M)	
Coffey, John Francis	Cook, Eugene Stephen (L)	Cook, Eugene Stephen (L)	Va
Coffey, Charles Thomas	L.E.E. 1922, Cornell University	L.E.E. 1922, Cornell University	Va
Coffey, John Stoddard, Jr.	Cook, Frances Jane	Cook, Frances Jane	
A.B. 1914, The George Washington	Cook, George Henry (L)	Cook, George Henry (L)	
University	B.M.E. 1911, The George Washington	B.M.E. 1911, The George Washington	
Coffey, Gerald Edward	University	University	Va
A.B. 1911, Brownwater College	Cook, Gordon Howard	Cook, Gordon Howard	Mo
Coffey, Charles Thomas	Cook, George Collins (L)	Cook, George Collins (L)	N.Y.
Coffey, John Curtis	A.B. 1911, Ohio Wesleyan University	A.B. 1911, Ohio Wesleyan University	
Coffey, David Monty	Cook, Jack Ross	Cook, Jack Ross	
Coffey, York Ray	A.B. 1911, Ohio's University, Canada	A.B. 1911, Ohio's University, Canada	
Coffey, James Joseph (L)	A.M. 1912, The George Washington	A.M. 1912, The George Washington	
A.B. 1911, The George Washington	University	University	Va
University	Cook, Joseph Emerson	Cook, Joseph Emerson	Mo
Coffey, Thomas Laura	A.B. 1911, Indiana University	A.B. 1911, Indiana University	N.Y.
B.S. 1917, Indiana State College	Cook, Lewis	Cook, Lewis	
Coffey, Frank Edward	Cook, Mary (L)	Cook, Mary (L)	
Coffey, George John (M)	A.B. 1911, Indiana University	A.B. 1911, Indiana University	Ind
A.B. 1911, University of Pittsburgh	A.M. 1911, Indiana University	A.M. 1911, Indiana University	N.Y.
Coffey, Paul Vail	Cook, Mary (L)	Cook, Mary (L)	
B.S. 1911, U.S. Naval Academy	Cook, Marion	Cook, Marion	
Coffey, Bryant William (L)	A.B. 1911, Indiana University	A.B. 1911, Indiana University	
B.S. 1911, Indiana State University	M.S. 1911, College of the City of	M.S. 1911, College of the City of	
Coffey, Gail McGinn	New York	New York	Ind
B.S. 1911, Pennsylvania State	Cook, Robert Houston	Cook, Robert Houston	Va
University	Cook, Samuel	Cook, Samuel	
Coffey, James Arthur	B.S. 1911, Johns Hopkins University	B.S. 1911, Johns Hopkins University	Ind
Coffey, Neal Stuart (L)	Cook, Thomas Lewis	Cook, Thomas Lewis	
B.M.E. 1911, Indiana State College	Cook, Thomas Schaefer	Cook, Thomas Schaefer	
Coffey, Patrick Henry			

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Students Registered

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Dale, Philip Gale	D.C.	J. Anselmann, Irma Richard IV	Calif.
Daley, Sophie R.	Va.	B.S. 1931, Stanford University	D.C.
A.B. 1934, Queens College		Dallas, Lincolnton William	
M.S. 1938, Syracuse University		B.S. 1932, The George Washington	
Daley, John Nicholas	Me.	University	Va.
Dallas, Joseph Antonio	D.C.	Dalrymple, David Norton, Jr.	
A.B. 1933, Syracuse University		B.S. 1935, The George Washington	
Dalrymple, Edward Bernard	Me.	University	Me.
Dalrymple, Robert R.	Wis.	Dalrymple, Herbert Laurel	
Daly, Lawrence Cutting	D.C.	B.S. A.B. 1931, Stanford State	
A.B. 1935, Yale University		College	Vt.
Damer, Herbert Theodore	Me.	Dalrymple, John Thomas Curtis (Jr.)	
B.S. 1935, College of the City of		A.B. 1936, L.L.B. 1937, The George	
New York		Washington University	
M.S. 1941, Iowa State Teachers College		Dalrymple, Otto Hall, Jr. (Jr.)	
Daniel, John William	Me.	B.S. 1936, American University	D.C.
Daniel, Carol Frances	Pa.	Dalrymple, Joseph Grant	D.C.
Daniel, James Monroe	Va.	Daniel, John Park (Jr.)	
Daniel, Michael Lucare	Va.	B.S. 1935, Franklin and Marshall College	Va.
Daniel, John	D.C.	Danielson, Gregory Frederick	Pa.
Daly, James Flannery	Me.	Danielson, Mary Alice	Me.
A.B. 1938, Notre Dame College		Darlington, Thomas J. (Jr.)	
Daly, Janet Valerie	Va.	B.S. 1939, R.S. 1940, M.S. 1941,	
Daly, John Joseph	Me.	Pennsylvania State University	Vt.
Daly, John Malcom	D.C.	Davis, Harry	D.C.
Daly, Thomas	Me.	Davis, Robert [Sawyer]	
Dandridge, Eric	D.C.	B.S. 1936, University of California	
Dandridge, Hugh Jerome	D.C.	A.M. 1940, The George Washington	
Dandridge, George George	Me.	University	Va.
Dandridge, Robert Walter (Jr.)	Va.	Dawson, Morris	
A.B. 1937, University of Washington		A.B. B.S. 1934, A.M. 1938, University	
A.M. 1939, Fairleigh College of Law		of Missouri	D.C.
and Economics		Dawson, Emma Patricia	N.Y.
M.F.A. 1939, Harvard University		Dawson, Gerald Harold	Me.
D'Amico, Louis Joseph	Ohio	Dawson, Max John	
D'Amico, George Ross	D.C.	Dawson, Roy Allen	
Davis, Anne Schick (Jr.)	N.Y.	A.B. 1935, The George Washington	
A.B. 1935, Cornell University		University	W.Va.
Davis, William Elwyn	D.C.	Davis, Herbert Edward	D.C.
Davis, William Stanford (Jr.)	N.Y.	Davis, John Monroe	D.C.
B.D.S. 1935, L.L.B. 1935, Cornell		Davis, Paul Monroe	D.C.
University		Davis, Albert J.	
Davis, George	Pa.	B.D.S. 1937, University of Texas for	Me.
Davies, Henry Warren (Mf)	D.	Davis, William George (Jr.)	D.
A.B. 1935, Jackson College		Davis, Betty Virginia	
A.M. 1941, University of South Dakota		A.B. 1935, Thomas Wesleyan University	N.Y.
Davis, Maybelle Mae	Vt.	Davis, David M.	
A.B. 1935, University of California		Davis, Gerald Earl	
Davis, Warren	D.C.	B.F.L. 1938, North Carolina State	D.C.
Davis, Robert Herman	Va.	College	N.Y.
A.B. 1938, The George Washington		Davis, David Ann	Me.
University		Davis, David Joseph	
Davis, Sidney Theodore (Jr.)	Va.	Davis, Parker Parker	
A.B. 1941, New York University		B.S. in F. 1938, University of	
L.L.B. 1941, The George Washington		Pennsylvania	D.C.
University		Davis, Donald Lawrence III	
Davis, Alan Murray	N.Y.	Davis, David A.	D.C.
Davis, Arthur James	D.C.	A.B. 1935, University of Washington	Va.
Davis, Wayne Thomas	N.Y.	Davis, Harold Miles	
Davis, John George, Jr. (Jr.)	D.C.	Davis, Philip (Rud)	
A.B. 1934, Newark University		Davis, Sam Martin	
Davis, Anne Catherine	Me.	B.S. 1935, Rosemead University	D.C.
Davis, Donald (Jr.)	N.Y.	Davis, John	Va.
B.S. 1938, University of Buffalo		Davis, John Park	
Davis, Norman Earl	Pa.	Davis, David A.	
Davis, Edward Henry	Va.	A.B. 1935, Annapolis College	Tenn.
Davis, Samuel Edward	Va.	Davis, Kenneth L. (Jr.)	
Davis, Francis Edward	Va.	A.B. 1935, Tennessee State College	
Davis, Donald Bruce	Tenn.	B.S. 1935, D.V.M. 1935, Tusculum	
College, M.D.		University and Medical College	
Davis, Lucian Marie	D.C.	Davis, Alfred Edward	
Davis, George M. (Jr.)	Me.	Davis, Lee	
Davis, Harry Marjorie	Va.	B.S. 1935, Waverly College	

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Davis, Claude Irwin, Jr. A.B. 1911, The George Washington University	MD	Doback, Ethel Helen B.S. 1913, A.M. 1917, The George Washington University	D.C.
Davis, David George (MD) A.B. 1909, Bryn Mawr University	D.C.	Dodge, Pauline Virginia Darius, Robert Edward	W.
Davis, Harold Anthony (LL.B.) B.S. 1912, New York University	N.Y.	Dominick, John Thomas (M) B.S. 1911, University of Wisconsin	W.
Davis, Robert Cecil A.B. 1911, Union College	D.C.	Dominick, Grace May Dominick, John Thomas (LL.B.)	MD
Davis, Jack Charles, Jr. (LL.B.) LL.B. 1912, University of Alabama	Ala.	Dominick, John Thomas (LL.B.) A.B. 1911, Southern State College	D.C.
Davis, Martha Virginia Darius, Nathaniel Ruford	MD	Dominick, James Donald Dominey, Robert Hiram	W.
Davis, Robert (LL.B.) B.S. 1909, Mount Tennessie College	D.C.	Dominick, Elbert Patrick A.B. 1912, Union College	W.
Davis, Robert (LL.B.) A.B. 1911, D.D. 1917, Syracuse University	MD	Dominick, George Ross Dominick, Edward Benjamin	N.Y.
Davis, Ronald Elton Dennis, William Emory (LL.B.)	Va.	B.M.E. 1911, South Dakota State College	Va.
A.P. 1911, Union and Henry College LL.B. 1912, University of Richmond	MD	Dennis, Eugene Lester Dennis, William Elbert	MD
Davis, Thomas William (LL.B.) A.B. 1911, Municipal University of Warsaw	Va.	B.S. 1912, Montana State University	Ala.
Davison, Charles John Daw, Robert Lloyd (LL.B.)	Calif.	Dennis, Lawrence Christian Dennis, John Patrick	D.C.
B.S. 1911, Indiana University M.A. 1912, University of Illinois	D.C.	Dennis, Charles Paul Dennis, Charles George	MD
Dawson, Donald Louis Dawson, John Maurice	D.F.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Louis John Dawson, Philip James	MD	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Dorothy Hume (M) B.S. 1911, Union University	D.C.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Philip James, Jr. Dawson, William George (LL.B.)	Va.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, William George (LL.B.) Dawson, William George (LL.B.)	Va.	Dennis, Charles George Dennis, Charles George	D.C.
A.B. 1911, Southern University Dawson, James Allen	N.Y.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Oscar Evelyn, Jr. (MD) Dawson, Barbara Ann	Ill.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, James Monroe (M) Dawson, Hume Hume	D.C.	Dennis, Charles George Dennis, Charles George	D.C.
M.D. 1912, University of Colorado M.D. 1911, University of Michigan	Va.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Peter William Dawson, John George	MD	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Marvin Telford Dawson, Mary Marshall	D.C.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Helen Johnson Dawson, John Adams	Ill.	Dennis, Charles George Dennis, Charles George	D.C.
A.B. 1911, Princeton College Dawson, Margaret Ann	D.C.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Charles Louis A.B. 1911, Oberlin College	MD	Dennis, Charles George Dennis, Charles George	D.C.
A.M. 1911, School of Advanced International Studies Dawson, Nell Francis	MD	Dennis, Charles George Dennis, Charles George	D.C.
A.B. 1911, Mount Union College Dawson, Robert Allen (LL.B.)	MD	Dennis, Charles George Dennis, Charles George	D.C.
B.S. 1911, University of Idaho Dawson, Bert Christian	MD	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, William Edward B.S. 1911, Mount Union College	D.C.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Allen Shaw M.D. 1911, A.B. 1912, The George Washington University	D.C.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Katherine Gwynne Dawson, Edwin Francis, Jr.	D.C.	Dennis, Charles George Dennis, Charles George	D.C.
Dawson, Edwin Francis, Jr.	N.Y.	Dennis, Charles George Dennis, Charles George	D.C.

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Students Registered

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[illegible]

Fisher, Wanda Froehner	D.C.	Feltham, David Brown (M)	Ar.
A.B. 1931, Iowa State Teachers College		A.B. 1932, The George Washington University	
A.M. 1933, University of Florida			
Fisher, James Melvin, Jr.	D.C.	Fering, Vincent James	N.Y.
Ph.D. 1936	D.C.	Ferlin, N. J.	N.Y.
Fisher, Ida Ann	D.C.	Ferlin, V. W.	
B.S. 1934, The George Washington University		B.M.E. 1936, Brooklyn Polytechnic Institute	D.
Fisher, Kenneth John, Jr.	Va.	Ferlin, David J. (L)	
B.S. 1931, Massachusetts Institute of Technology		B.S. 1933, University of Pennsylvania	N.J.
		Ferlin, John (M)	
Fish, George Thomas	Pa.	B.S. 1933, Rutgers University	M.
A.B. 1931, University of Pennsylvania	Va.	Ferlin, John Henry	D.C.
Fish, John Francis, Jr.	Md.	Ferlin, Marion Paul	D.C.
Ph.D. 1936, University of Pennsylvania	Md.	Ferlin, Ann Margaret	M.
Fish, John W.	Md.	Ferlin, Stanley George	D.C.
A.B. 1931, Duke University		Ferlin, David R. (L)	D.C.
Fish, John Mary	Pa.	Ferlin, Frederick Paulson	D.C.
Fish, Lawrence Jr. (M)	Puerto Rico	Ferlin, John Lee III	Va.
B.S. 1931, The George Washington University		Ferlin, J. Edward (L)	D.
		A.B. 1933, University of Virginia	
Fish, John Francis	Va.	A.M. 1934, American University	M.
A.B. 1931, University of Massachusetts		Ferlin, Glen Walter (L)	
Fish, David Paul	D.C.	A.B. 1933, M.F.A. 1935, Cornell University	D.
A.B. 1931, University of Missouri			
Fish, William Joseph	N.Y.	Ferlin, Howard Frank	Ar.
A.B. 1931, Cornell College		Ferlin, James William	D.C.
Fish, John Lee, Jr.	D.C.	Ferlin, Stanley Louis	D.C.
A.B. 1931, The George Washington University		Ferlin, Lee, Franklin (L)	D.C.
		A.B. 1934, Penn State College	D.C.
Fish, Albert Vernon	Md.	Ferlin, R. A. (L)	
A.M.F. 1931, University of Connecticut		A.B. 1931, Williams College	Ar.
Fish, John Edward	D.C.	Ferlin, Theodor Edgar	D.C.
B.S. 1931, University of Maryland		Ferlin, Richard (L)	D.C.
Fish, Norman Francis (M)	N.M.	A.B. 1931, Harvard University	D.C.
A.B. 1931, Cornell College		Ferlin, Anna (L)	D.C.
Fish, Harry L.	D.C.	Ferlin, Michael Ben Peleg	Ph.D.
A.B. 1931, Williams College		Ferlin, Louis Lawrence	D.C.
LL.B. 1936, Columbia University		LL.B. 1937, State of New York	D.C.
Fisher, Edward Paul	D.C.		
A.B. 1931, Williams College		Ferlin, Harry Robert	D.C.
Fisher, Mary Louise	N.Y.	Ferlin, M. (L)	
Fisher, Robert Norman, Jr.	N.Y.	Ferlin, Anna Elizabeth	D.C.
A.B. 1931, Williams College		B.S. 1931, University of Rhode Island	D.C.
LL.B. 1931, Georgetown University		Ferlin, Edwin Albert	D.C.
Fisher, Arthur Moore	Kans.	Ferlin, James Joseph (L)	D.C.
A.B. 1931, Young College		B.S. 1931, Rutgers University	D.C.
M.F.A. 1931, Western Reserve University		Ferlin, George Joseph	D.C.
Fisher, Charles	N.Y.	A.B. 1931, L.S. 1931, The George Washington University	D.C.
A.B. 1931, Williams College		Ferlin, Arthur	D.C.
Fisher, Roy Herbert	Va.	A.B. 1931, M.F.A. 1935, University of Washington	Ar.
Ph.D. 1931, Case Western Reserve College		Ferlin, William Robert	D.C.
Fish, Maria (M)	N.J.	A.B. 1931, The George Washington University	D.C.
Fish, James Lindsay	Md.		
A.B. 1931, The George Washington University		Ferlin, James Joseph	D.C.
		B.S. 1931, The George Washington University	D.C.
Fisher, Edward Henry (L)	D.C.	Ferlin, Louis Paul	D.C.
A.B. 1931, The George Washington University		Ferlin, George LaRue	D.C.
Fisher, Robert Joseph	N.Y.	B.S. 1931, Georgetown University	D.C.
Fisher, William	D.C.	Ferlin, George Joseph (L)	D.C.
Fisher, John Duffie	D.C.	Ferlin, William Henry (L)	D.C.
Fisher, Jack Albert Young (L)	Conn.	A.M.F. 1931, University of Maryland	Ar.
A.B. 1931, Western Connecticut State College		Ferlin, Charles R.	D.C.
Fisher, Seymour	D.C.	A.B. 1931, The George Washington University	M.
A.B. 1931, Brooklyn College			
Fisher, Philip (M)	Pa.	Ferlin, Louis Lee	D.C.
Fisher, David Leonard	Va.		
Fisher, Neil Lee	N.Y.		

Students Registered

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[illegible]

Farrington, Francis Edmund	Va	Flynn, Joseph Earl	D.C.
B.S. 1931, University of Maryland		A.B. 1934, The George Washington	
Farrington, Francis James	D.C.	University	D.C.
B.O.C.E. 1938, Catholic University of		Flynn, Ronald Joseph	D.C.
America		Flynn, R. V. and William	N.Y.
Farrington, Robert Moore	D.C.	Flynn, Lady Mary	
Farrington, Thomas (Colony), Jr.	D.C.	A.B. 1914, The George Washington	D.C.
Farrington, Alfred Thomas, Jr. (L)	D.C.	University	D.C.
B.S. 1919, William Treadwell College		Flynn, Raymond	D.C.
Farrington, Allen James	Va	Flynn, Mary Anna	Pa.
B.S. 1913, U. S. Navy Academy		Farrington, John William	Pa.
Farrington, Edward F. (M)	D.C.	B.S. 1923, General College	
A.B. 1911, University of North Carolina		Farrington, William John (L)	
A.M. 1922, University of Texas		A.B. 1912, The George Washington	Md.
Farrington, John Paul	D.C.	University	Pa.
Farrington, Leonard Wayne	D.C.	Farrington, John Nathan	Pa.
Farrington, John Thomas	D.C.	Farrington, Helen Anne	D.C.
Farrington, Margaret Earl (L)	Md.	Farrington, Robert Earl (L)	
A.B. 1914, Western Maryland College		A.B. 1911, The George Washington	
A.M. 1918, B.L.S. 1922, Columbia		University	Md.
University		Farrington, Louis Frederick	Pa.
Farrington, Newell	D.C.	A.B. 1914, The George Washington	Pa.
Farrington, Nicholas Eugene	Md.	Farrington, Michael Joseph	W.Va.
Farrington, Thomas Eugene	Md.	Farrington, William Joseph	
Farrington, Delbert Eugene	D.C.	Farrington, William	
Farrington, John Thomas	Va	B.M.E. 1915, B.C.E. 1922, Carnegie	Pa.
Farrington, John Thomas	D.C.	University of Technology	Pa.
Farrington, Virginia Ruth Manning	Va	Farrington, Arthur Cecil	Pa.
A.B. 1916, Saint George's		Farrington, James	Pa.
Farrington, George Vincent	Va	Farrington, John Anthony (L)	
A.B. 1914, The George Washington		A.B. 1914, University of Maryland	Md.
University		Farrington, Robert R. (L)	Md.
Farrington, James Anne	Md.	Farrington, Lella Jane	Pa.
A.B. 1914, The George Washington		A.B. 1916, Washington University	Pa.
University		Farrington, Edward Eugene	D.C.
Farrington, Charles M.	Va	A.B. 1911, Western Maryland College	
A.B. 1911, Shenandoah State College		Farrington, William Eugene	Md.
Farrington, Francis Francis	W.Va.	B.S. 1916, U. S. Military Academy	
A.B. 1912, West Virginia		Farrington, Linton Richard	Pa.
University		B.B.A. 1917, College of the Holy Cross	D.C.
Farrington, Robert George (L)	Pa.	Farrington, Nicholas Robert	Pa.
A.B. 1914, Pennsylvania State University		Farrington, Charles William, Jr.	Va.
Farrington, Richard Allen	Va	Farrington, Oswald Percival	
B.S. 1911, University of Illinois		Farrington, Howard Percival	
Farrington, William Oswald	Va	B.S. 1918, M.A. 1920, Kansas State	Pa.
Farrington, Thomas William, Jr.	D.C.	University	Pa.
B.S. 1914, The George Washington		Farrington, John M.	
University		Farrington, Michael Joseph	N.Y.
Farrington, William Heath	Md.	B.S. 1911, New York University	
Farrington, John Moore	D.C.	A.M. 1922, Columbia University	
A.B. 1911, Mount Holyoke College		Farrington, William Joseph	Pa.
Farrington, Bruce Francis	Va	B.S. 1911, College of the City of	Pa.
B.S. 1910, A.M. 1922, University of		New York	Pa.
America		Farrington, Thomas John	Pa.
Farrington, Paul J. (L)	Pa.	Farrington, Henry III (L)	Pa.
A.B. 1911, Lebanon Valley College		A.B. 1911, University of	W.Va.
Farrington, Frank	Kans.	Farrington, Thomas R. (L)	
Farrington, John Anne	N.Y.	Farrington, Hugh Raymond	Pa.
B.S. 1911, The George Washington		B.E. 1921, A.M. 1922, West Virginia	Pa.
University		University	Pa.
Farrington, Robert Clinton	N.C.	Farrington, Louis O.	Md.
Farrington, Edward Donald	Md.	Farrington, Joseph Edward	Pa.
Farrington, John Phillips	Va	Farrington, George Raymond	Pa.
A.B. 1913, The George Washington		Farrington, Thomas Hamilton	Md.
University		Farrington, John William	
Farrington, Sylvia Maria	Md.	B.S. 1911, Columbia University	
Farrington, Thomas Margaret	Md.	Farrington, Charles Francis	N.Y.
Farrington, Fred Francis	Va	B.S. 1912, Pennsylvania State	
Farrington, George Joseph, Jr. (L)	Md.	Teachers College, Supplementing	D.C.
M.E. 1922, University of Minnesota		Farrington, Lillian Louise	
		A.B. 1910, Seaside College	
		Farrington, Ralph	

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Students Registered

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Gottlieb, Charles Max	Md.	Graves, Kathleen L.	D.C.
B.S. 1937, Penn College		Graves, Phyllis Marie	D.C.
Grout, Mary Margaret	Md.	A.B. 1938, Hunter College	Md.
Grout, Edward Lowell	Md.	Graves, Edward Scott	D.C.
Grout, Stuart Allen	N.J.	Grout, Ann Amelia	D.C.
Grout, Walter	Va.	Grout, Bessie Lee	D.C.
A.B. 1935, The George Washington		Grout, Charles Herman (L.)	Md.
University		Grout, Thomas Charles	D.C.
Grout, William Samuel	D.C.	Grout, James Cecil	D.C.
Grout, Lyle Gordon	D.C.	Grout, James Remond	D.C.
Grout, Karl S.	D.C.	Grout, John Alexander (L.)	D.C.
Grout, John Marcus	Mass.	A.B. 1931, Dartmouth College	Md.
A.B. 1930, Mount College		Grout, John Arthur	Va.
Grout, Anne Elise	D.C.	Grout, John Thompson	D.C.
Grout, Joseph	D.C.	Grout, John Mayne	D.C.
Grout, Thomas	Va.	Grout, Miss Anna	Va.
Grout, John William	Philad.	Grout, Paul Cary	D.C.
Grout, John Frank	D.C.	Grout, Robert Richard (M)	D.C.
Grout, Donald Eugene	D.C.	Grout, Robert Alan, Jr.	Va.
Grout, James Michael	D.C.	Grout, Robert Lee	D.C.
Grout, Henry William IV	Gen.	Grout, Samuel	Gen.
A.B. 1935, Washington and Lee		Grout, Bruce Livingston	Md.
University		Grout, Kathleen Beatrice	
Grout, Joseph William	Md.	A.B. 1927, Colby College	
B.S. 1934, The George		A.M. 1935, The George Washington	
Washington University		University	
Grout, Thomas Burton (L.)	Md.	Grout, Bill Blair	Va.
A.B. 1934, The George Washington		B.M.E. 1936, Virginia Polytechnic	
University		University	
Grout, Virginia Louise	D.C.	Grout, Vernon Elmer	
A.B. 1934, The George Washington		A.B. 1938, A.M. 1943, The George	
University		Washington University	
Graham, Andrew Stuart, Jr.	Pa.	Grout, Thomas Francis (L.)	Pa.
B.S. 1931, Lehigh University		A.B. 1931, Occidental College	Calif.
Graham, Betty	Va.	Grout, Stella	N.J.
Graham, Betty Rae	D.C.	Grout, Joseph Anthony	D.C.
Graham, Gertrude Agnes	Pa.	Grout, Rosemarie Cornelia	
Graham, Kathleen Louise	Tenn.	Grout, Louise Florence	Calif.
Graham, Kenneth Donald (M)	Wash.	B.S. 1932, Fiske University	Va.
B.S. 1935, University of Washington		Grout, Francis Duncan, Jr.	Md.
Graham, Lucile Eleanor	Va.	Grout, Gerald	Gen.
B.S. 1930, Cornell University		Grout, Jack Allen	Gen.
M.E.A. 1935, Stanford University		Grout, James Laffler	
Graham, Roberta McLaughlin	Va.	B.S. 1928, U.S. Military Academy	D.C.
Graham, William Gordon	D.C.	B.C.E. 1932, University of California	N.Y.
B.S. 1936, U.S. Naval Academy		Green, Mabel Henson	Calif.
Green, Paul Philip (L.)	Md.	Green, Norman	Md.
A.B. 1939, Bowdoin College		Green, Robert Hansen	Md.
Green, August Robert	Conn.	Green, Robert Patrick	Md.
Green, Clifford	Pa.	Green, William Henry, Jr.	Va.
Green, Edgar Stewart	Va.	Green, Beverly Adams	Pa.
B.S. 1931, L.M. 1933, University		Green, Caroline Byron	D.C.
of Virginia		Green, David Lee	N.
Green, Stephen Leonard (M)	Md.	Green, David G.	Va.
A.B. 1937, Antioch College		Green, Eugene Harold	Md.
Green, Alan Henry	Md.	Green, Frank Philip	Md.
B.S. 1931, Ohio State University		Green, Gary Edward	Va.
Green, Blaine Louis	D.C.	Green, Katherine Virginia (M)	
Green, Harry Lee	Va.	B.S. 1935, Eastern Nazarene College	
Green, Sam Houston	Va.	A.B. 1938, B.D. 1941, The George	
Green, Ronald Lee	Va.	Washington University	
Green, John Mark Lee	Va.	Green, Margaret Pyper	Va.
B.S. 1934, Cornell University		B.S. 1937, Stanford University	
Green, Dr. David Owen	D.C.	Green, Michael Taron (L.)	Calif.
B.S. 1935, A.B. 1937, St. Francis		B.E.L. 1938, Georgia Institute of	
University		Technology	
Green, Charles Mar	Calif.	Green, Robert Beatty, Jr.	Va.
Green, Emil Peter, Jr.	D.C.	Green, Virginia Evelyn	Pa.
A.B. 1932, The George Washington		Green, Walter Scott	
University		B.S. 1934, Syracuse University	
Green, Michael	N.I.	M.S. 1931, The George Washington	
B.S. 1937, Bucknell University		University	
Green, Edwin D.	Md.		
Green, Francis Vernon	D.C.		

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Students Registered

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Hansen, William Bryan	Va	Homer, Mary Elizabeth	Ohio
Hansen, Herbert Charles	N.Y.	B.S. 1914, Ed. 1916, Kansas State University	
Hansen, U.S. Naval Academy	D.C.	A.M. 1914, The George Washington University	
Hansen, Ronald Henry	D.C.	Homer, Yvonne Sarah	Mo.
Hansen, Martin Everett	D.C.	Homer, Elizabeth K. 1914	Mo.
Hansen, Emma Louise	N.Y.	B.S. 1914, University of Minnesota	
Hansen, Anthony Louis (I.)		Homer, Klean Alexandra	D.C.
B.S. 1914, Council of the City of New York		Homer, Joseph Morris	N.Y.
Harris, John Cassius, Jr. (M)	Pa.	Homer, Joseph Ford	D.C.
A.B. 1914, University of Virginia		Hood, Frank	Mo.
Harris, William Carl, Jr. (L)	Va	B.S. 1914, Council of the City of New York	
B.S. 1914, American University		Hood, George William	D.C.
Harris, William John, Jr.	Va	Hood, Fred Edwin, Jr.	D.C.
A.B. 1914, University of Virginia		Hood, Michael Charles	D.C.
Harris, M. Russell	I.C.	Hood, Marjorie	
Harris, Margaret Helen	M.	A.B. 1914, Boston College	
Harris, Emma Marie	M.	A.M. 1914, American University	
A.B. 1914, American University		Hood, Arnold (Carl) (L)	Va.
Harris, Thomas Fletcher	Pa.	Hood, George A.	Va.
B.S. 1914, The George Washington University		Hood, Oscar Morgan	Mo.
Harris, Frank Clinton	Va	Hood, Charles Gordon (L)	
Harris, William Wallace	Va	B.S. 1914, Georgetown College	
Harris, George H.	Pa.	Hood, Edward Gordon, Jr.	Pa.
Harris, John	Pa.	B.S. 1914, University of Maryland	
Harris, Thomas	Va	Hood, Emma Tipton	Pa.
B.S. 1914, University of Florida		B.S. 1911, Middle Tennessee State College	
Harris, Mary Alice	Pa.	Hood, George Rockledge	Pa.
Harris, Anna	Texas	Hood, John Anthony	D.C.
Harris, George Ann	I.C.	B.S. 1914, University of Maryland	
Harris, Frank John	Mo.	Hood, Sam Moore	D.C.
A.B. 1914, U.S. Naval Academy		Hood, Ray Butler	D.C.
Harris, Ralph A. Jr.	Mo.	Hood, Wallace Archer	M.
B.S. 1914, University of Maryland		Hood, William Ketter	M.
B.S. 1914, University of Vermont	D.C.	A.B. 1914, American University	
Harris, Sydney Shaw		A.B. 1914, The George Washington University	
Harris, William Paul	D.C.	Hood, George Ann	D.C.
Harris, Robert Emmett	D.C.	Hood, David Joseph	Mo.
Harris, Theobald	Pa.	A.B. 1914, Western College	
B.S. 1914, Maryland State Teachers College, Towson	Mo.	Hood, James Eugene	D.C.
Harris, Albert, Jr.		Hood, Nicholas Peter	Pa.
A.B. 1914, University of Virginia	D.C.	Hood, Henry Francis	D.C.
Harris, Robert William Henry		B.S. 1911, M.A. 1914, Ed. 1914, University of Pennsylvania	
B.S. 1914, University of Maryland	Va	Hopper, Richard Neil	Va.
Harris, John Louis	D.C.	A.B. 1914, Edgewood College	
Harris, John Henry	D.C.	Hopper, Kurt Heinz	Va.
Harris, Mary E.	D.C.	Hopper, John	D.C.
B.S. 1914, University of Virginia	Va	Horn, William Louis	D.C.
Harris, William Henry	Va	Horn, Joseph Chas.	D.C.
Harris, John Andrew	D.C.	Horn, Jack Turner	D.C.
Harris, Anna, Emma	Pa.	Horn, George Louis	Va.
B.S. 1914, University of Notre Dame	D.C.	B.S. 1911, A.M. 1914, Columbia University	
Harris, Charles	Ohio	Horn, James Albert	Pa.
A.B. 1914, University of Wisconsin		Horn, Herbert Gordon	Va.
B.S. 1914, University of Maryland	Pa.	A.B. 1914, The George Washington University	
Harris, Robert Mary, Jr.	Va	Horn, John Mae	D.C.
A.B. 1914, The George Washington University	I.C.	A.B. 1914, The George Washington University	Va.
Harris, John	Pa.	Horn, Ruth Charles	S.D.
Harris, John	Pa.	A.B. 1914, American College	
M.A. 1914, University of Maryland	D.C.	A.M. 1914, The George Washington University	
		Horn, William Paul	Va.
		Horn, Ruth Grace	Va.

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Students Registered

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Students Registered

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Leath, William Howard	Md	Legge, Withrow Reynolds, Jr.	Va
Leath, Vincent Perry	Va	B.S. 1927, Virginia Polytechnic Institute	Pa
Leckie, John Van Reed	Va	Leon, Wilbur David	Md
Leckie, Joseph Robert (L.)	Md	Leon, Alois H.	Va
B.S. 1928, University of Maine		Leon, Louis Ann	
LeCraw, Marie (J.)	Kan	A.B. 1929, Wesleyan College	Pa
A.B. 1927, The George Washington University		Letina, M. Dorothy Helen	Pa
Letourneau, Gerald Matthew	D.C.	Leto, Adele F.	
Letourneau, Virginia Irene Metz	D.C.	A.B. 1924, Queens College	Pa
Letourneau, John Edward	Va	Leto, Richard	Va
Letourneau, Lavinia Delle	D.C.	Leto, Michael Michael	Mass
B.S. 1923, University of Idaho		B.S. 1932, College of William and Mary	
Levine, Lewis Morris	Calif	Levinson, Delmar J.	Va
Levinson, Alan Morris	S.C.	A.B. 1931, Harvard University	
Levinson, Henry Albert	D.C.	Levinson, Linwood	
Levinson, Robert K.	Md	A.B. 1929, Tufts College	
B.S. 1921, West Texas State College		A.M. 1931, The George Washington University	Md
Levinson, Stanley		Levinson, Stanley	
Levinson, K. Milton	D.C.	A.B. 1932, College of the City of New York	N.Y.
Levin, Chas. A. Van	D.C.	Levin, Richard James	Pa
Levin, Donald Edward	Va	A.B. 1928, Rutgers University	
Levin, Thomas Elmer	D.C.	Levine, Margaret Ann	Va
B.S. 1926, California Agricultural and Mechanical College		A.B. 1926, Pennsylvania State University	
Levin, Elton Grant (L.)	D.C.	Levin, Gerald Irvin, Jr.	Va
B.S. 1926, Commerce College		B.S. 1928, Virginia Polytechnic Institute	
Levin, Earl May	D.C.	Levin, Theodore Houston, Jr.	Pa
B.S. 1927, University of Houston		B.S. 1929, University of Maryland	
Levin, K. (M.)	D.C.	Levinson, Jack	
Levinson, Francis (L.)	Va	P.B. 1934, Maryland State Teachers College, Towson	W.D.
A.B. 1926, Elizabeth Young University	D.C.	Levinson, Dora Lavern	Pa
Levin, Jay		Le, Mary Mary Elizabeth	
Levin, Louis Leonard	Md	A.B. 1921, The George Washington University	Va
A.B. 1926, A.M. 1928, The George Washington University		Levinson, Ruth	N.Y.
Levin, Louis Lillian	Go	Levinson, Thomas E.	Md
A.B. 1926, University of Georgia		Levinson, George Marshall, Jr. (L.)	
Levin, Mary Emma	D.C.	A.B. 1927, Tufts College	
A.B. 1922, Cornell University		Levinson, Edgar Joseph	
Levin, Michael Van Allen	W.Va	A.B. 1921, The George Washington University	Va
Levin, Morris	Ind	Levinson, Benjamin Benjamin	Pa
M.S. 1929, University of Chicago		Levinson, Morris Leonard	Pa
Levin, Morris Jay Morris	Va	Levin, James Joseph	Pa
B.S. 1921, Newcomb State College		P.B. 1926, Pennsylvania College	
Levin, Virginia Louise	Va	Levinson, Thomas J. Aron	
Levin, Charles Lawrence	Va	Levinson, Henry Henry (L.)	
A.B. 1926, The George Washington University		A.B. 1926, Princeton College	Md
Levin, David Fleming (M.)	Md	L.L.B. 1928, Harvard University	
A.B. 1922, The George Washington University		Levinson, Pauline Adams	D.C.
Levin, Michael Morris	Va	B.S. 1924, M.S. 1928, University of Maine	Pa
A.B. 1922, M.A. 1924, University of Maine		Levinson, David Louise	Mass
Levin, Robert Edgar	Md	Levinson, John Thomas, Jr.	N.Y.
B.S. 1926, Louisiana State University		Levinson, John Thomas, Jr.	
Levinson, Morris Morris	Md	A.B. 1926, Macomber College	
Levinson, Morris Morris	Va	Levinson, Louis Cameron (L.)	
M.A. 1926, The George Washington University		A.B. 1926, Washington and Lee University	Pa
Levinson, Morris Morris	D.C.	Levinson, Mary Cecile	Pa
Levinson, Morris Morris	Va	Levinson, Mildred Lee	
Levinson, Morris Morris	Md	Levinson, Carl Keith	
Levinson, Morris Morris	N.Y.	A.B. 1924, A.M. 1926, The George Washington University	Va
Levinson, Morris Morris	N.Y.	Levinson, Robert James	Md
Levinson, Morris Morris	N.Y.	A.B. 1928, A.M. 1930, University of Toronto	
Levinson, Morris Morris	D.C.	Levinson, Robert Sterling	
Levinson, Morris Morris	Md	A.B. 1926, L.L.B. 1928, The George Washington University	
Levinson, Morris Morris		A.M. 1928, Harvard University	

Martinez, Juan Vincent	D.C.	Martinez, James William	MI
Martinez, Peter	Va.	Martin, Thomas Joseph	N.Y.
Martinez, Jorge M.	Pa.	Martin, Cecil Joseph	Va.
Martinez, Lawrence Charles (M)	Pa.	Martin, David Mervin (L)	MI
B.S. 1944, Franklin State University		A.B. 1941, University of Maryland	
Martinez, Victor Hugo	Va.	L.B. 1941, National University	
B.S. 1941, University of Maryland		Martinez, Luis Enrique	MI
Martin, Arthur Edward	D.C.	Martinez, George Arnes	MI
Martin, George Lewis, Jr.	N.Y.	Martin, David Mervin (L)	
A.B. 1944, The George Washington University		A.B. 1941, Franklin College	
A.M. 1946, Johns Hopkins University		Martin, George Victor	
Martin, Ed Paul	D.C.	Martin, Bruce Allen	
A.B. 1944, Franklin College		B.S. 1941, University of Maryland	
Martinez, Michael L. (L)	Va.	Martin, Paul Lee	
B.S. 1944, Franklin College		Martin, John Edward	
Martin, Louis Ray	D.C.	B.S. 1941, Franklin College	
Graduate, Biology, Albany		Martin, Mary Lee	
Martin, John Henry	Va.	Martin, John Henry	
Martin, John	D.C.	Martin, John Henry	
Martin, John M.	N.Y.	A.B. 1941, The George Washington University	
A.B. 1941, Franklin College		Martinson, Mary Robert	
Martin, John Mervin	D.C.	A.B. 1941, The George Washington University	
Martin, John Raymond	MI	Martinson, Mary Robert	
B.S. 1944, University of Rhode Island		Martin, Anne Louise	
Martin, John Henry	D.C.	A.B. 1941, Richmond-Macon Woman's College	
Martin, John Henry (L)	MI	A.M. 1946, The George Washington University	
B.S. 1941, University of Maryland		Martin, Anne Louise	
Martin, Alexander Vincent	MI	Martin, Anne Louise	
Martin, Henry	D.C.	Martin, Anne Louise	
Martinson, Charles Maurice	Kent	Martin, Anne Louise	
Martinson, Edward Paul	MI	Martin, Anne Louise	
A.B. 1941, Franklin College		Martin, Anne Louise	
Martinson, Edward Paul	D.C.	Martin, Anne Louise	
Martinson, Edward Paul	D.C.	Martin, Anne Louise	
A.B. 1941, University of Maryland		Martin, Anne Louise	
A.M. 1946, The George Washington University		Martin, Anne Louise	
Martin, William L. Jr.	Va.	Martin, Anne Louise	
A.B. 1941, University of Rhode Island		Martin, Anne Louise	
Martinson, Andrew B.	Va.	Martin, Anne Louise	
A.B. 1941, The George Washington University		Martin, Anne Louise	
Martinson, John Albert	D.C.	Martin, Anne Louise	
Mary, Lee N. K.	D.C.	Martin, Anne Louise	
Martinez, Arthur Guernsey	Pa.	Martin, Anne Louise	
Martin, Max Norman	R.I.	Martin, Anne Louise	
Martin, Carl	N.Y.	Martin, Anne Louise	
Martinson, H. Taylor	D.C.	Martin, Anne Louise	
Martinson, Joseph John	D.C.	Martin, Anne Louise	
Martinson, Mary Louise	D.C.	Martin, Anne Louise	
B.S. 1944, Pennsylvania State University		Martin, Anne Louise	
Franklin College		Martin, Anne Louise	
B.S. 1941, Franklin and Marshall University		Martin, Anne Louise	
Martin, John Marshall	MI	Martin, Anne Louise	
Martin, Charles Arthur, Jr. (L)	Va.	Martin, Anne Louise	
B.S. 1941, The George Washington University		Martin, Anne Louise	
Martinson, Linda Margie	D.C.	Martin, Anne Louise	
Martinson, Alfred Charles (L)	N.Y.	Martin, Anne Louise	
L.B. 1941, The George Washington University		Martin, Anne Louise	
Martinson, John Lewis	Va.	Martin, Anne Louise	
B.S. 1941, U.S. Naval Academy		Martin, Anne Louise	
Martinson, Mary Helen DeFronza	D.C.	Martin, Anne Louise	
Martinson, James Ralph (M)	N.J.	Martin, Anne Louise	
A.B. 1941, Franklin College		Martin, Anne Louise	
Martinson, Joseph Charles	D.C.	Martin, Anne Louise	
Martinson, Natalie D.	D.C.	Martin, Anne Louise	

May, Irving	D.C.	McCardell, Joseph Martin	Va
B.S. 1926, College of the City of New York		McCaughy, Charles Edward	Va
M.S. 1928, The George Washington University		McCaughy, Marie Elizabeth	Va
Mayberry, George Luther (L)	Mo	McCarthy, Constant Constant	Pa
A.B. 1924, The George Washington University		McCarthy, Thomas Joseph, Jr	Pa
Mayfield, John Arnold	N.Y.	McCarthy, Frank Wade, Jr	Va
B.E. 1921, H. M. 1927, University of Pa.		McCarthy, John Robert	N.Y.
Mayes, Marjorie J.	D.C.	McCarthy, Vincent Constant	Pa
Mayes, Norman	D.C.	A.B. 1924, University of Toronto	Pa
Mayes, William Sardin	N.Y.	McCauley, George Eugene	Pa
Mayhew, Earl Stanley	D.C.	A.B. 1924, University of Pennsylvania	Pa
Mayhew, Helen O'Duffy (L)	D.C.	McCauley, Joseph Victor	Pa
B.S. 1924, New York University		McCauley, Paul James	Pa
Mayne, Ronald Wayne (L)	Kans	McCauley, Harold Wesley	Pa
B.M.E. 1927, Kansas State College		McCauley, Thomas John	Pa
Mayo, Susan Ann	Va	McCauley, William Arnold	Va
Mayo, Florence	Puerto Rico	McCauley, James Patterson	Pa
A.B. 1924, The George Washington University		A.B. 1927, Syracuse University	Pa
Mayo, Frank Louis	Fla	McCauley, William Thomas	Pa
Mayo, Howard	Mass	McCauley, George Victor	Pa
Mayo, William Walter James	D.C.	McCauley, Harvey Dunn	Pa
B.E. 1924, The George Washington University		E.S. 1924, Davidson College	Pa
Mayo, Fred Center	D.C.	McCauley, Louis	Pa
May, M. Benjamin	Mo	A.B. 1924, The George Washington University	Pa
B.S. 1926, New Hampshire University		McCauley, Ruel Eugene	Pa
May, Arthur Robert	Mo	McCauley, Houston Burns (L)	Pa
McAlamy, Patricia S.	D.C.	A.B. 1924, Indiana State College	Pa
McAlamy, Ruth Edith	D.C.	McCauley, John Alexander	Pa
McAlamy, Frances Marion	Mass	McCauley, Thomas Robert	Pa
B.S. 1927, U.S. Naval Academy		McCauley, Margaret Disney	Pa
McAlamy, Martin DeWitt	Va	McCauley, Ann Marie	Pa
McAlamy, William L. (L)	Pa	McCauley, George Jewell	Pa
B.S. 1924, Pennsylvania State University		McCauley, George Kevin	Pa
McAlamy, Nathan Eugene (L)	Va	McCauley, Cornelia Sloane	Pa
B.S. 1924, Pennsylvania State University		A.B. 1924, Vassar College	Pa
McAlamy, Susan Kaye (L)	Va	McCauley, Thomas Eugene	Pa
B.S. 1927, Louisiana State University		McCauley, Clyde Franklin	Pa
McAlamy, Frank Ross	Va	B.S. 1924, Florence State Teachers College	Pa
McAlamy, Mary Henry	N.J.	McCauley, Henry Leonard (M)	Pa
McAlamy, Charles Clifford	D.C.	A.B. 1924, University of Texas	Pa
McAlamy, Charles Jay, Jr	Va	A.M. 1927, The George Washington University	Pa
McAlamy, John D. (L)	N.Y.	McCauley, Mary Ellen (L)	Pa
A.B. 1924, The George Washington University		A.B. 1924, The George Washington University	Pa
McAlamy, John Thomas	Pa	McCauley, George Robertson	Pa
McAlamy, Herbert James	Pa	McCauley, John Joseph, Jr	Pa
E.S. 1927, American College		McCauley, M. Louise	Pa
McAlamy, William James	Pa	McCauley, Mary Law	Pa
B.M.E. 1924, Thomas Institute of Technology		McCauley, James Milne	Pa
McAlamy, Robert Ann	Ky	McCauley, Robert Palmer	Pa
A.B. 1924, The George Washington University		E.S. 1924, The George Washington University	Pa
McAlamy, Ruth Ann	D.C.	McCauley, William Franklin	Pa
McAlamy, Carl Eugene	Va	A.B. 1924, A.M. 1927, Michigan State College	Pa
McAlamy, Charles Herbert, Jr	Mo	McCauley, Fred Walter (M)	Pa
A.B. 1924, A.M. 1926, The George Washington University		B.S. 1924, York State Agricultural College	Pa
McAlamy, Richard Allen	D.C.	McCauley, Richard Morris	Pa
McAlamy, Harry Edwin, Jr	D.C.	McCauley, Robert Morris	Pa
McAlamy, James Paul	Mo	McCauley, Walter Frank	Pa
McAlamy, Florence Mary	Mo	McCauley, Kelly Thomas, Jr	Pa
B.S. 1924, American University		McCauley, James John	Pa
McAlamy, Robert Thomas	Mo	McCauley, Charles Edward	Pa
B.E. 1924, The George Washington University		E.S. 1924, M.S. 1926, The George Washington University	Pa
McAlamy, Theodore Robert	Mo	McCauley, James Kearns	Pa
McAlamy, Thomas Francis	Pa	McCauley, James Melvin	Pa
B.E. 1924, University of Pittsburgh			Pa

M. K. Jones, Elmer Frank (MD)	Va.	M. Noss, John Rapp	W. Va.
A.B. 1924, University of Virginia		M. Noss, Robert Rapp	
M. K. Jones, Thomas (MD)	Ala.	E.S. 1924, Pennsylvania State Teachers	
M. K. Jones, Daniel Yonke, Jr. (MI)	Calif.	College West Chester	Pa.
E.S. 1924, University of Oklahoma		M. Noss, James Rapp	Mo.
M. K. Jones, Wade James	D.C.	M. Noss, James Rapp	
M. K. Jones, Mary Louise	Me.	E.S. 1925, University of Missouri	Mo.
M. K. Jones, Gary Davis, Jr.	Va.	M. Noss, John Rapp	
M. K. Jones, David	Va.	M. Noss, John Rapp (D)	
A.B. 1925, University of Notre Dame		A.B. 1925, The George Washington	
M. K. Jones, Edna E.	Va.	University	
M. K. Jones, James E. Kent	Va.	M. Noss, John Rapp	
M. K. Jones, William W. Jones, Jr.	Kan.	M. Noss, John Rapp	
A.B. 1925, University of Kansas		M. Noss, John Rapp	
M. K. Jones, James Jones	D.C.	A.B. 1925, The George Washington	
M. K. Jones, John Jones	D.C.	University	
A.B. 1925, The George Washington		M. Noss, John Rapp	
M. K. Jones, Mary Jones	Conn.	M. Noss, John Rapp	
M. K. Jones, Mary Jones	D.C.	M. Noss, John Rapp	
M. K. Jones, Mary Jones	N.Y.	A.B. 1925, The George Washington	
A.B. 1925, University of Missouri		M. Noss, John Rapp	
M. K. Jones, Mary	D.C.	M. Noss, John Rapp	
E.S. 1925, U. S. Merchant Marine		M. Noss, John Rapp	
Academy		M. Noss, John Rapp	
M. K. Jones, John Seaton (D)	Ark.	E.S. 1925, U. S. Merchant Marine	
M. K. Jones, Barbara Ann	Va.	Academy	
M. K. Jones, George Allen	Mass.	M. Noss, John Rapp	
M. K. Jones, Mary Jones	D.C.	M. Noss, John Rapp	
M. K. Jones, Helen Mae	D.C.	M. Noss, John Rapp	
M. K. Jones, Thomas Anthony	D.C.	A.B. 1925, The George Washington	
A.B. 1925, The George Washington		University	
M. K. Jones, William Howard	D.C.	M. Noss, John Rapp	
M. K. Jones, John Patrick	D.C.	M. Noss, John Rapp	
M. K. Jones, Richard Paul (MI)	Myne	E.S. 1925, Maine State Teachers	
A.B. 1925, Bowdoin College		College, Bowdoin	
M. K. Jones, Robert Wallace	Ind.	M. Noss, John Rapp	
A.B. 1925, Ball State Teachers College		M. Noss, John Rapp	
L.L.B. 1927, LL.M. 1928, S.T.D. 1929,		M. Noss, John Rapp	
University of Chicago		M. Noss, John Rapp	
M. K. Jones, Ohio Wallace	Va.	A.B. 1925, LL.B. 1926, Washington	
A.B. 1925, A.M. 1929, University of		and Lee University	
Virginia		M. Noss, John Rapp	
M. K. Jones, Alexander Ross	Me.	B.S. 1924, Brigham Young University	
M. K. Jones, Robert Laine	Va.	M. Noss, John Rapp	
E.S. 1924, Virginia Polytechnic Institute		M. Noss, John Rapp	
M. K. Jones, Robert Laine	Va.	A.B. 1924, Princeton University	
E.S. 1924, Virginia Polytechnic Institute		M. Noss, John Rapp	
M. K. Jones, Helen Jones	Va.	M. Noss, John Rapp	
M. K. Jones, David Newton	Ark.	M. Noss, John Rapp	
M. K. Jones, Robert Vanover (D)	Ind.	M. Noss, John Rapp	
A.B. 1924, The George Washington		M. Noss, John Rapp	
University		M. Noss, John Rapp	
M. Noss, James Nelson (MI)	W. Va.	M. Noss, John Rapp	
A.B. 1925, West Virginia University		M. Noss, John Rapp	
M. Noss, John Nelson (MI)	Va.	M. Noss, John Rapp	
A.B. 1925, University of Missouri		M. Noss, John Rapp	
M. Noss, George Nelson (D)	N.C.	A.B. 1925, University of North Carolina	
E.S. 1925, University of North Carolina		M. Noss, John Rapp	
M. Noss, John Nelson	N.Y.	A.B. 1925, University of North Carolina	
A.B. 1925, University of North Carolina		M. Noss, John Rapp	
M. Noss, Robert Nelson	Va.	M. Noss, John Rapp	
E.S. 1925, University of North Carolina		M. Noss, John Rapp	
M. Noss, Robert Nelson	Me.	A.B. 1925, A.M. 1927, University of	
A.B. 1925, A.M. 1927, University of		Missouri	
M. Noss, John Nelson	Va.	M. Noss, John Rapp	
A.B. 1925, Ball State Teachers College		M. Noss, John Rapp	
A.M. 1927, The George Washington		M. Noss, John Rapp	
University		M. Noss, John Rapp	
M. Noss, William Jones, Jr.	Va.	M. Noss, John Rapp	
E.S. 1922, U. S. Naval Academy		M. Noss, John Rapp	
M. Noss, Elizabeth Jones	D.C.	M. Noss, John Rapp	
M. Noss, William David, Jr.	Pa.	M. Noss, John Rapp	

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Students Registered

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Moss, Arnold	D.C.	Muller, Raymond	N.Y.
B.S. 1912, University of Maryland		B.S. 1941, U.S. Naval Academy	
Moss, Lionel Dwight	ME.	M. Ed. 1940, University of California	N.J.
A.B. 1940, University of Redlands		Muller, Robert Everett	Va.
Murphy, Philip Walter	Ill.	B.S. 1941, U.S. Naval Academy	Va.
B.S. 1941, U.S. Naval Academy		Mulligan, James Francis	Va.
Murphy, Edward Arnold	Va.	Munroe, Robert Michael	
Murphy, Vera Thompson	Va.	Munroe, William Jerome	
Murphy, Francis Ralph	ME.	B.E.E. 1940, Pennsylvania State University	D.C.
Murphy, Harold	Pa.	Munroe, Gail Laurie	SC.
Murphy, Robert Edward	Pa.	Munroe, George Latimer	D.C.
Murphy, Raymond	ME.	Munroe, Charles Edward (M)	
Murphy, Caroline Brown	ME.	A.B. 1941, Pennsylvania State University	Va.
Murphy, John James	Pa.	Munroe, George Joseph	Va.
Murphy, Robert Edward	Pa.	A.B. 1941, Pennsylvania State University	
Murphy, David Eugene	D.C.	Munroe, Jessie Keith	
Murphy, David	D.C.	A.B. 1940, The George Washington University	D.C.
Murphy, James	D.C.	Munroe, Ann Josephine	D.C.
Murphy, John George	Ill.	Munroe, Patricia Ann	D.C.
Murphy, Charles Vincent	D.C.	Munroe, Charles Louis	
Murphy, Edward Joseph	Pa.	Ph.D. 1948, University of Languages, Naples, Italy	D.C.
Murphy, Robert Stephen		Munan, Louis Pat	
B.S. 1913, Yale University		A.B. 1940, M.S. 1950, The George Washington University	Ohio
Murphy, William Joseph	Pa.	Mundy, Robert Earl	D.C.
A.B. 1916, St. Francis College		Munizaga, Fernando	Mass.
M.S. 1947, The Pennsylvania State University		Munn, Robert Hector	Va.
Murphy, Henry (L)	Pa.	Munnecke, Charles Marshall	
B.S. 1947, Drexel Institute of Technology		A.B. 1927, LL.B. 1930, University of Minnesota	D.C.
Murphy, Joseph	D.C.	Munro, Sanford Sterling	D.C.
Murphy, Walter Lawrence (L)		Munroe, Dorothea Kobbs	Va.
B.S. 1947, U.S. Naval Academy		Munro, Albert Ralph	
Murphy, Robert Edward	ME.	B.S. 1947, M.S. 1949, University of Illinois	D.C.
A.B. 1944, Hampshire College		Munson, Marlene Marie	
Murphy, Arthur Joseph	ME.	A.B. 1953, The George Washington University	Va.
B.S. 1948, Washington College		Munson, Thomas Richard	D.C.
Murphy, Andrew Joseph	D.C.	B.S. 1951, The George Washington University	Va.
Murphy, Andrew Joseph	D.C.	Munson, William Bergman	
Murphy, Andrew Joseph	D.C.	Muntz, John Allen	Va.
Murphy, Andrew Joseph	D.C.	A.B. 1950, Davis and Elkins College	Me.
Murphy, Andrew Joseph	D.C.	Murack, Robert Thomas	
Murphy, Andrew Joseph	D.C.	Munata, Kiguma Jack	Hawaii
Murphy, Andrew Joseph	D.C.	B.S. 1916, The George Washington University	Va.
Murphy, Andrew Joseph	D.C.	Munroe, Ann Trunko	
Murphy, Andrew Joseph	D.C.	Munroe, John Dandridge (L)	Texas
Murphy, Andrew Joseph	D.C.	A.B. 1955, Virginia Military Institute	
Murphy, Andrew Joseph	D.C.	Murphy, Jesse Oran	
Murphy, Andrew Joseph	D.C.	A.B. 1941, The George Washington University	Va.
Murphy, Andrew Joseph	D.C.	Murphy, Randolph Clay III	
Murphy, Andrew Joseph	D.C.	Murphy, Alan Ralph	
Murphy, Andrew Joseph	D.C.	B.S. 1951, Minnesota State Teachers College, St. Cloud	Va.
Murphy, Andrew Joseph	D.C.	Murphy, Albert Ignatius	Me.
Murphy, Andrew Joseph	D.C.	A.B. 1951, Boston College	D.C.
Murphy, Andrew Joseph	D.C.	Murphy, Claire Mary	Mass.
Murphy, Andrew Joseph	D.C.	Murphy, David James	
Murphy, Andrew Joseph	D.C.	Murphy, David Joseph, Jr. (L)	R.I.
Murphy, Andrew Joseph	D.C.	B.S. 1947, Northeastern University	Va.
Murphy, Andrew Joseph	D.C.	Murphy, Frederick Joseph	Me.
Murphy, Andrew Joseph	D.C.	Murphy, James Emmett	Va.
Murphy, Andrew Joseph	D.C.	Murphy, James Francis	D.C.
Murphy, Andrew Joseph	D.C.	Murphy, John Robert	
Murphy, Andrew Joseph	D.C.	Murphy, John Stewart	

[illegible]

Patterson, Norman	ME	Patt, T.J. Stair	ME
A.B. 1946, Clark University		Parker, Henry Louisa	ME
Patt, Amy Marilyn	Va	Parker, Cady Lewis (M)	ME
Patt, Neil B.	Va	B.S. 1911, University of California	M
Patterson, Kenneth John	ME	Parker, John Purcell	ME
Patterson, Richard Elmer (L)	D.C.	Parker, Harold Curtis	ME
B.S. 1941, University of Maryland		Parker, James James	ME
Patt, George Alexander	D.C.	Parker, John James	ME
Patterson, John Harry	ME	B.S. 1911, University of Wisconsin	ME
Patterson, Andrew Kleantus	Pa	Parker, Lily Frances	ME
Pattola, Anna Maria	N.Y.	A.B. 1926, Washington College	ME
Pattolillo, Mary Ay (L)	D.C.	Parker, Margaret Louisa	ME
A.B. 1926, Lebanon Valley College		B.S. 1926, Mount Vernon College	ME
A.M. 1917, Pennsylvania State University		A.M. 1924, F.D. 1925, University of Wisconsin	ME
Patt, William Frank (L)	Va	Parker, Norman Elbert	ME
A.B. 1918, Lehigh University		Parker, R. Otto	ME
Patt, William Harry	Va	Parker, R.J. Williams	ME
Patterson, Daniel Robert	ME	Parker, Richard Caldwell	ME
Patterson, Harold Lee	Pa	Parker, Robert Harold	ME
Patterson, John Gilbert	ME	Parker, Robert Lee	ME
A.B. 1930, M.S. 1931, The George Washington University		Parker, Roscoe	ME
Patterson, John Sanford	D.C.	A.B. 1911, University of Illinois	ME
B.S. 1926, Morgan State College		Parker, Roy Martin	ME
Patterson, Francis Taylor	ME	Parker, Roy Taylor	ME
Patterson, Ruth Buck, Jr.	ME	Parker, Scott Lee	ME
Patterson, Raymond Rudolph	ME	Parker, James Lloyd (L)	ME
A.B. 1917, Wiley College		A.B. 1916, The George Washington University	ME
A.M. 1920, Washington University		Parker, Kenneth Louisa	ME
B.M. 1922, University of Missouri		A.B. 1911, American College	ME
Patterson, Robert Richard	ME	Patterson, William Howard	ME
Patterson, Louis	ME	A.B. 1911, University of Maryland	ME
Pattola, Wayne Bruce	ME	Patterson, David Cooper	ME
A.B. 1926, College of William and Mary		Patt, Albert James	ME
Patt, Lee	D.C.	A.B. 1911, The George Washington University	ME
B.S. 1910, Dryden College		Patt, James	ME
Patterson, Gus	Va	Patt, James James, Jr.	ME
Patterson, John	D.C.	Patt, James J.	ME
Patt, Margaret Fuld	Haw	Patt, James William	ME
A.B. 1914, The George Washington University		Patt, John James	ME
Patterson, John Robert	Va	A.P. 1911, University of California	ME
Patterson, James John (L)	ME	at Los Angeles	ME
A.B. 1911, Lawrence University		Patt, James A. (L)	ME
Patterson, John Nelson	D.C.	B.S. 1911, University of California	ME
Patterson, John Robert	N.J.	Patt, James James, Jr.	ME
Patterson, John	N.J.	Patt, William James	ME
Patterson, John	D.C.	Patt, William James	ME
Patterson, Nicholas M.	D.C.	Patt, William James	ME
B.S. 1914, American University		Patt, William James	ME
M.S. 1911, The George Washington University		Patt, William James	ME
Patterson, Charles Arthur	D.C.	Patterson, Robert James	ME
Patterson, James Bruce	ME	Patterson, John M. (L)	ME
Patterson, William (M)	D.C.	B.S. 1911, Mary Washington College	ME
B.S. 1911, The George Washington University		Patterson, John M.	ME
Patterson, Matthew	D.C.	Patterson, Norman William	ME
Patterson, Arthur Edmund, Jr.	D.C.	Patterson, James Douglas	ME
B.S. 1911, The George Washington University		A.B. 1911, The George Washington University	ME
Patterson, Randolph Frederick	D.C.	Patterson, John Frederick	ME
Patterson, Walter Henry	D.C.	Patterson, Mabel Lee	ME
B.S. 1911, University of North Carolina		A.B. 1911, The George Washington University	ME
Patt, Harry Frederick	D.C.	Patterson, William James	ME
Patt, Harold Lewis	ME	Patterson, William James	ME
Patt, Elizabeth Roy	ME	Patterson, William James	ME
Patt, John George	ME	Patterson, William James	ME
B.S. 1911, M.S. 1911, The George Washington University		Patterson, William James	ME
Patt, Robert James	ME	Patterson, William James	ME
B.S. 1914, University of Florida		Patterson, William James	ME

[illegible]

Pendergast, Cathleen Margaret	Va.	Peter, Suzanne Reynolds	Va.
A.B. 1949, Stenson University		A.B. 1942, Hiram College	Ar.
Pendleton, Catherine Ann	D.C.	Peters, Audrey Ann	Ind.
Penn, William Thomas	Va.	Peters, Carol Ann	Va.
Pennington, Donald Jeffery	Va.	Peters, David Randolph Saunders	N.Y.
A.B. 1941, Santa Barbara State College		Peters, Edmund LeRoy	
Pennington, Robert Jr.	Va.	B.S. 1942, Missouri State College	Mo.
M.D. 1944, Hahnemann Medical College		Peters, Johanna Mary	Mo.
and Hospital		Peters, Marshall B. H. H. H.	
Penzel, John Thomas	S.C.	B.S. 1944, University of Maryland	Va.
Pepitone, Donald (L.)	Calif.	Peters, Martha Lillian	
B.S. 1948, University of California,		A.B. 1941, Randolph-Macon Women's	
Berkeley		College	D.C.
Perrin, Chae Edwin	D.C.	Peters, Valdemar	
Perrin, Richard Livingston (M)	Va.	A.B. B.S. 1944, Florida State College	Ind.
A.B. 1945, The George Washington		Peterson, Inge Hana	Va.
University		B.S. 1941, Iowa State College	Cal.
Perr, Ralph James	N.J.	Peterson, Lillian Jeannette	Ill.
B.S. 1942, Adelphi College		Peterson, Charles Hoffrid, Jr.	Ohio
Perrin, Donald James	Mo.	Peterson, Charles Raymond (M)	
L.L.B. 1948, St. Louis University		Peterson, Douglas Harold (M)	Minn.
Perrin, Gustav	D.C.	A.B. 1942, Ohio State University	
Perrin, Roy Arthur	Va.	Peterson, Glen Douglas	
Perrin, John Franklin	MI	B.B.A. 1944, University of Minnesota	Va.
Perrin, Arthur	Calif.	Peterson, Henry Edwin, Jr.	Pa.
Perrin, Lillian	D.C.	Peterson, Kevin Alexander	Ind.
Perrin, Patricia V.	D.C.	Peterson, Margaret Lee	Va.
Perrin, Jane Frances	Va.	Peterson, Sharon Powell	D.C.
Perrin, Allen Lambert	Mo.	Peterson, Thomas	Ind.
B.S. 1941, Kansas State College		Peterson, Bernice Helgeta	Va.
Perrin, Harry Marshall	D.C.	Perrin, Anne Arnette	
Perrin, Franklin Glenn, Jr.	Va.	Perrin, Sara Paul (L.)	Va.
Perrin, Judith Lorraine	N.Y.	A.B. 1945, University of North Carolina	Ar.
Perrin, Stuart	D.C.	Perrin, Lillian	Mo.
Perrin, Marvin Martin	D.C.	Perrin, Augustus Walton	Ar.
Perrin, Helen Thomas	Ma.	Perrin, Ann Lindsay	Mo.
Perrin, Donald Charles	N.Y.	Perrin, Carolyn Anne	Va.
Perrin, Margaret Phillip	MI	Perrin, Tom George	Ind.
Perrin, Linda Thayer	D.C.	Perrin, James Neilman	MI
Perrin, Scott Bryant	D.C.	Perrin, Ray George	Wash.
Perrin, Joseph James	Tex.	Perrin, Jack Bennett	
A.B. 1947, Stephen F. Austin State		Perrin, David W. (L.)	Va.
College		Perrin, David W. (L.)	Gen.
Perrin, Thomas Andrew	Va.	A.B. 1944, W.	
Perrin, John	Va.	Perrin, John Phillip	Va.
Perrin, John	Calif.	Perrin, James George	Ind.
A.B. 1947, Berk College		Perrin, James Henry	Ind.
B.F.A. 1944, California College of		Perrin, James Ann	Va.
Art and Crafts		Perrin, Jack Lee	
Perrin, Grady, Jr.	Ar.	Perrin, Charles Scott (L.)	D.C.
Perrin, John Robert	D.C.	B.F.A. 1947, Pennsylvania State	Va.
Perrin, Raymond George	D.C.	University	
Perrin, Robert Jasper	Ma.	Perrin, Patricia Knox	Va.
Perrin, Ruth Ellen	Ind.	Perrin, Patricia Lee	
Perrin, Douglas Edward	Calif.	Perrin, John James	Mo.
Perrin, Vernon Paul	MI	A.B. 1944, College of William and Mary	
Perrin, William Dial (L.)	D.C.	Perrin, Anna Pauline	D.C.
A.B. 1944, Princeton University		B.S. 1947, California State College	
Perrin, James Albert	D.C.	Perrin, Frank Pauline	D.C.
Perrin, Ronald Thomas	D.C.	A.B. 1947, A.M. 1948, The George	
A.M. 1941, American University		Washington University	
Perrin, Ronald Bruce	Mo.	Perrin, Lawrence Vernon	Ind.
Perrin, Ed (L.)	Thailand	A.B. M.D. 1947, The George	
A.M. 1944, University of Tennessee		Washington University	
Perrin, Margaret	Pa.	Perrin, Joseph Joseph (L.)	Ar.
Perrin, Joseph Ralph	Ill.	A.B. 1944, Yale University	
A.B. 1946, The George Washington		Perrin, Mary Jane	Ar.
University		B.S. 1941, The University of Pennsylvania	
Perrin, Joseph Francis	Pa.	Perrin, Robert Francis (M)	Cal.
Perrin, Thomas Benoit	D.C.	B.S. 1944, Hiram College	
Perrin, Paul Francis	Va.	Perrin, Thomas Marshall (L.)	
B.S. 1948, Stenson University		B.F.A. 1944, American University	

Students Registered

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Phar, Harold Andrew			
Phar, John William (L.)			
B.F.E. 1926, University of New Hampshire	MD	Pharson, Teresa Marie	D.C.
Phar, Victor Lindeberg	N.H.	Pharson, Leonard Lewis (M)	N.Y.
Pharson, Harry John	D.C.	A.B. 1921, Harvard University	
Pharson, James Lee	N.Y.	Pharson, Charles Theodore	I.
Pharson, John	D.C.	B.S. 1926, Holy Cross College	
Pharson, Elizabeth Grah	D.C.	A.B. 1927, Westminster College	
Pharson, Robert Hiram	Va	Pharson, Henry Gomers	D.C.
B.F.E. 1924, The George Washington University	Va	B.S. 1928, Duke University	
Pharson, Jack Milton (L.)	Va	Pharson, Roger Bradford	Va
A.B. 1925, The George Washington University		A.B. 1928, Cornell University	
Pharson, Nina Alvares	Ill	LL.B. 1914, National Law School	
A.B. 1921, AM. 1924, The George Washington University		Pharson, Eugene Hiram	Calif.
Pharson, Carol Louise	Md	Pharson, James Joseph	Va
Pharson, John	D.C.	Pharson, Lee J.M.	Md
Pharson, William Moore	D.C.	B.S. 1921, Maryland State College	
Pharson, John L.	D.C.	Pharson, Ralph Weldon (L.)	Va
A.B. 1921, The George Washington University	D.C.	B.S. 1928, University of Maryland	
Pharson, John R. James	D.C.	Pharson, Samuel Edward	N.Y.
B.F.E. 1924, The George Washington University	D.C.	B.S. 1921, Tulane University	
Pharson, Charles Paul		Pharson, Leonard	Fla.
Pharson, Raymond Douglas		B.F.E. 1924, The George Washington University	
A.F. 1924, University of Rochester			
AM. 1928, The George Washington University		Pharson, Albert Rufus	Md
		Pharson, Virginia William Jr.	W.Va.
		Pharson, Jack Paul (L.)	
		B.S. 1921, West Virginia University	
		Pharson, Walter J.	
		B.S. 1921, B.C.E. 1923, Penn. Univ.	
		Pharson, Helen Anna	Md
		Pharson, William Gustave	Md
		Pharson, John Bruce (L.)	N.Y.
		Pharson, Vincent Augustus	Md
		Pharson, Arthur Robert	Md
		B.N.E. 1914, Newark College of Engineering	
		Pharson, Louis Jay	Ill.
		Pharson, Richard Paul	Ill.
		Pharson, Thomas	Md
		A.B. 1914, The George Washington University	
		Pharson, John W.	D.C.
		Pharson, John E.	D.C.
		Pharson, Vernon Anthony	I.
		Pharson, John Ray (L.)	D.C.
		Pharson, Robert Van Buren	Md
		A.B. 1921, Union University	
		LL.B. 1921, Harvard University	
		Pharson, Thomas Nicholas Jr.	I.C.
		A.B. 1921, University of Richmond	
		Pharson, Clarence Francis Jr.	D.C.
		P.E. 1921, U.S. Naval Academy	
		Pharson, Joseph Stanley (M)	D.C.
		B.S. 1921, Grove City College	
		Pharson, David	D.C.
		Pharson, Fred	Calif.
		Pharson, Lillian	Fla.
		A.F. 1921, S. O. Dunn School of Law and	
		AM. 1921, Fletcher School of Law and	
		University	
		Pharson, William Francis	Va
		Pharson, Robert William	Md
		B.S. 1921, U.S. Merchant Marine Academy	
		Pharson, Fritz	D.C.

Peril, Hattie L. Linwood	Maine	Peris, Celeste Gwendolene	MA
B.S. 1942, University of Michigan		Peris, Edwin Harland	
M.S. 1948, The George Washington University		A.B. 1941, University of Mississippi	
Perle, Frances Ann	D.C.	A.M. 1946, Colorado State College of Education	
Perlmutter, Edward Irvine, Jr.	D.C.	Perkins, Gwendolyn	Va.
Perkins, Mary et Jane	MA	Potts, Paul Russell	Calif.
Perle, Patricia Jane	D.C.	Powers, William Edward	Va.
A.B. 1941, Michigan State College		Pournore, Lillian Ann	MA
Perle, Robert Harry	N.J.	Powcastone, Herman	
Perle, Thomas Arthur	Va.	Powell, Lynn Boyd	
Perle, T. R.	Ky.	I.L.B. 1948, National University	
Perle, James Sterling	MA	Powell, Katherine Louise	
Perle, Mary Ann	D.C.	A.B. 1944, Maryville College	
Perle, Betty Mary	MA	Powell, Kathleen Hedrick	MA
Perkins, Betty Sue	Va.	Powell, Lucine	
Perkins, Charles Anthony	Pa.	Powell, Lucine C. E.	
A.B. 1941, The George Washington University		B.S. 1947, U.S. Naval Academy	
Perkins, Joseph Henry	Va.	M.S. 1948, Macalester College	
P.C.E. 1941, The George Washington University		Tekamp	
Perkins, Albert Hamilton	Mass.	Powell, Louise Lawson	
A.B. 1944, Harvard College		B.S. 1944, Miami Teachers College	
I.L.B. 1941, Harvard University		Powell, Nellie Louise	
Perkins, Anthony Joseph	Va.	Powell, William A. Jr.	
Perkins, Arthur James	D.C.	A.B. 1941, St. William's University	
Perkins, James Walter	Ky.	Powell, John James	MA
B.S. 1941, Yale University		Powell, Lillian Alice Jr.	MA
Perkins, John Maurice	Va.	Powers, Philip William	Calif.
Perkins, Louis Lawrence	Va.	Powell, Edward Perry	
Perkins, Muriel Ann	Pa.	B.S. 1944, University of Missouri	N.Y.
Perkins, Paul A.	MA	Powers, John Stevens	MA
Perkins, Ruth Rebecca	MA	Powers, Norman	
A.B. 1944, The George Washington University		Powers, University of Medicine	
Perkins, Thomas George	Pa.	Powers, Mary Jane	
Perkins, William Morris (Jr.)	Calif.	Powers, Charles Robert, M.D.	
A.B. 1941, University of Connecticut		A.B. 1941, The George Washington University	
Perkins, Margaret K.	Va.	Pratt, James Davis	
Perkins, Robert James II	Va.	Pratt, Robert James	
Perkins, Robert James II	Va.	B.S. 1944, U.S. Naval Academy	
Perkins, Pauline C.	D.C.	B.T. 1944, M.C.E. 1944, Roosevelt University	MA
Perkins, Thomas Martin	Pa.	Pratt, Philip Preston	Mass.
Perkins, Muriel Ann	Calif.	A.B. 1941, Cornell University	
A.B. 1944, George Washington University		Pratt, Robert D.	MA
Perkins, Joseph Louis	D.C.	A.B. 1948, University of Buffalo	
Perkins, Horace S.	MA	Pratt, Nicholas Vincent	
B.S. 1943, College of the City of New York		B.S. 1941, The George Washington University	MA
M.S. 1941, Pacific University		Pratt, Benjamin Martin Jr.	MA
Perkins, David	D.C.	Pratt, Robert James	N.Y.
Perkins, Lawrence T.	MA	Pratt, John	D.C.
A.B. 1944, College of the City of New York		Pratt, Lynn Graham	Va.
Perkins, Selma Stephanie	MA	Pratt, Lynn Graham	
A.B. 1944, The George Washington University		Pratt, Lynn Graham	
Perkins, John Joseph	Pa.	Pratt, Lynn Graham	
Perkins, Evelyn Michael	D.C.	Pratt, Lynn Graham	
Perkins, John William	MA	Pratt, Lynn Graham	
B.S. 1941, The George Washington University		Pratt, Lynn Graham	
M.S. 1941, University of Maryland		Pratt, Lynn Graham	
Perkins, Susan May	MA	Pratt, Lynn Graham	
Perkins, William Chancy	D.C.	Pratt, Lynn Graham	
Perkins, Michael Jane	MA	Pratt, Lynn Graham	
Perkins, Mary Jane (M)	Calif.	Pratt, Lynn Graham	
A.B. 1941, Stanford University		Pratt, Lynn Graham	
Perkins, Robert Joseph (Jr.)	Nev.	Pratt, Lynn Graham	
A.B. 1941, University of Nevada		Pratt, Lynn Graham	
Perkins, William Joseph	Va.	Pratt, Lynn Graham	
B.S. 1941, California Institute of Technology		Pratt, Lynn Graham	

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[illegible]

Rabin, Joseph Edward	N Y	Rabinowitz, James John	Pa
A.B. 1911, The George Washington University		A.B. 1910, University of Pennsylvania	A
Rabin, Robert Manning (L.)	Va	Rabinovich, John Louis	
B.S. 1909, Cornell University		A.B. 1917, The George Washington University	
Rabin, James Melvin	Va	Rabinowitz, Albert Eugene	Va
B.S. 1948, Lehigh University		Rabinowitz, Joseph Nathan	
Rabin, Jack	N Y	A.B. 1918, University of Pennsylvania	Pa
B.S. 1917, College of the City of New York		Rabinowitz, William Walker	Mass
Rabin, Irving May	D C	Rabinowitz, David Thomas	Pa
A.B. 1911, West Liberty State College		Rabinowitz, Mary Hayden	
Rabin, George Richard (L.)	N Y	A.B. 1916, New York University	N Y
B.S. 1917, University of California		Rabinowitz, Herbert Roy	N Y
Rabinowitz, Stanley Arnold (L.)	D C	Rabinowitz, Louis Roy	
A.B. 1910, The George Washington University		A.B. 1911, Harvard University	N Y
Rabinowitz, Karl Lee	Mo	Rabinowitz, Leonard Arnold	
B.S. 1917, University of Missouri		A.B. 1916, University of North Carolina	
Rabinowitz, Robert Lee	Calif	Rabinowitz, Moses Ted (L.)	
A.B. 1916, University of Missouri		B.S. 1917, University of California	N Y
Rabinowitz, Raymond James (Mo)	Mass	Rabinowitz, Arthur	
A.B. 1916, Missouri State University		B.S. 1918, College of the City of New York	
Rabinowitz, John May	D C	A.M. 1917, New York University	Wash
A.B. 1916, American University		Rabinowitz, Joseph Philip (MI)	
Rab, Eugene Francis	Va	A.B. 1917, Harvard University	N Y
B.S. 1916, American University		Rab, William Henry	
Rab, Albert George (L.)	D C	Rabinowitz, Raymond Eugene	Pa
B.S. 1916, University of Massachusetts		A.B. 1916, University of Illinois	Ill
Rabin, Morris	D C	Rabinowitz, Frank Louis (L.)	
A.B. 1918, New York University		B.M.E. 1917, University of Illinois	Ill
Rabin, Charles Francis	Calif	Rabinowitz, Michael David	
Rabinowitz, Wayne Adolph	Va	A.B. 1917, University of South Carolina	A
A.B. 1916, The George Washington University		Rabinowitz, Walter Norman	Pa
Rabin, Jack (Calif)	D C	B.S. 1917, University of Wisconsin	Wis
B.S. 1917, University of California		Rabinowitz, George Henry	Mass
Rabin, Samuel Nathan	Va	Rabinowitz, Edward E.	D C
B.S. 1917, Virginia Transportation Institute		A.B. 1917, New England College	D C
Rabin, John (L.)	D C	Rabinowitz, John Philip	N M
B.S. 1917, Slovak University at Bratislava, Czechoslovakia		Rabinowitz, Philip Philip	
Rabin, Yoram Eugene	D C	Rabinowitz, William Carl	D C
A.B. 1917, The George Washington University		B.S. 1917, Georgetown University	Pa
Rabin, Maurice Francis (L.)	N H	Rabinowitz, Edward Allen	Wash
A.B. 1917, St. Anselm's College		Rabinowitz, Mark	
Rabinowitz, Thomas	Ky	Rabinowitz, Victor A. (L.)	N D
Rabin, Anne Louise	Va	B.S. 1917, U. S. Coast Guard Academy	
Rabin, Victor Victor	D C	Rabin, Robert (L.)	
Rabin, David Michael	N Y	A.B. 1917, University of Wisconsin	Wis
Rabin, John Raymond	Va	Rabin, John Robert (MI)	
Rabin, Robert Lee	D C	Rabin, Maurice Louis	N Y
Rabinowitz, Joseph Michael	D C	B.S. 1917, University of Illinois	
Rabin, John Michael	Va	Rabinowitz, Louis Louis	D C
Rabin, Thomas Anthony	Va	B.S. 1917, College of the Holy Cross	Va
Rabinowitz, A. Frederick	D C	Rabin, Jack Russell	Mass
Rabin, Victoria Beatrice	Mo	Rabin, Victoria Lawrence	V
Rabinowitz, Kenneth	D C	Rabinowitz, Virginia Reed	
Rabinowitz, Louis Bernard	D C	Rabin, Jean Louis	
Rabinowitz, Walter Gilbert	Va	B.S. 1917, College of the City of New York	D C
A.B. 1917, Furman University		A.M. 1917, New York University	V
Rabinowitz, Emily Jean	Pa	Rabinowitz, William Howard	
Rabinowitz, Keris Rabinowitz	D C	Rabinowitz, John Wainwright	Mo
A.M. 1917, University of Southern Indiana		A.B. 1917, University of Utah	
Raid, Vernon Elmer	Mass	Rabinowitz, James	Texas
Raid, Victor Otto	D C	A.B. 1917, The George Washington University	
Raid, Louis Eugene	Va	A.B. 1917, The George Washington University	
Raid, John Oliver	D C	Rabinowitz, Arthur	R I
Raid, Ruth Katherine	D C	B.S. 1917, University of Houston	
A.B. 1917, Swarthmore College		Rabinowitz, Louis Charles	
		Rabinowitz, John Charles	

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[illegible]

Roberts, Thomas David	Me.	Rochester, Robert Kendall	Va
B.S. 1944, U. S. Military Academy		Rock, Frank Patrick (L.)	Me.
Roberts, Walter Woodcock	Va	B.B.A. 1955, University of Miami	D.C.
Roberts, William Harrison	D.C.	Rocks, Gerald Herbert, Sr.	P.
Roberts, William Marvin	Me.	Rocks and Murray Alden (L.)	
B.S. 1941, Bowdoin College		B.S. 1945, M. Ed. 1949, University of	
Robinson, Charles Alfred	Va	Pittsburgh	P.
Robinson, David Justin	Me.	Rodack, Homer	Va
A.B. 1944, The George Washington		Rodden, Robert Gerald (L.)	
University		A.B. 1944, University of Pittsburgh	D.C.
Robinson, Jack Alfred	N.C.	A.M. 1949, American University	D.C.
Robinson, Robert Francis	D.C.	Rodgers, David Andrew	D.C.
B.S. 1946, U. S. Naval Academy		Rodgers, Carol Joseph	D.C.
A.B. 1944, The George Washington		Rodgers, Sanford Leonard	
University		A.B. 1948, Fresno State College	D.C.
Rodley, Thomas Stuart	Me.	Rodman, William Cady	Va
Rohde, Paul Andrew, Jr.	Va	Rodman, N. Louis Melvin	D.C.
Rohlfing, Oliver Valmore	Me.	Rodman, Samuel	
B.S. 1941, University of Maryland		B.S. 1942, North Dakota Agricultural	
Rohlfing, Charles Alexander (L.)	Va	College	
R.H.E. 1946, University of Virginia		A.M. 1944, The George Washington	Va
Rohlfing, Elizabeth Florence	Me.	University	
A.B. 1948, Bowdoin College		Rodland, Louise Herman	Me.
Rohlfing, Frank Kendall	D.C.	B.S. 1946, University of Wisconsin	P.
Rohlfing, George Schell	D.C.	Rodman, David Van	D.C.
A.B. 1945, The George Washington		Rodman, Herbert Henry, Jr.	P.
University		Rodman, Ann Florence	Va
Rohlfing, Gary (Harold, Jr.) (M)	Me.	Rodman, Edward Wayne	P.
A.B. 1946, The George Washington		Rodman, George Johnston	
University		Rodman, George Francis	D.C.
Rohlfing, Harold Louis (L)	Conn.	A.B. 1942, Western College	
A.B. 1944, The George Washington		Rodman, Louis Myron Edgar	P.
University		A.B. 1946, Cleveland College	P.
Rohlfing, William Henry	D.C.	Rodman, Louis Raymond	D.C.
Rohlfing, Howard Paul	W. Va.	Rodman, James Vernon	
B.B.A. 1946, University of Texas		Rodman, Melvin Louis	
Rohlfing, David	Me.	A.B. 1941, Stewart College for Christian	P.
Rohlfing, John Buchanan	Va	Workmen	
Rohlfing, John William	Me.	Rodman, Marvin Allen	Me.
Rohlfing, John Wayne, Jr.	Va	B.S. 1945, Western Tennessee College	
Rohlfing, Louis James, Jr.	P.	Rodman, Mary Carolyn	D.C.
Rohlfing, Mable Williams	D.C.	B.S. 1944, University of Maryland	
B.S. 1946, American University		Rodman, Michael (L.)	P.
Rohlfing, Mary Joseph	D.C.	B.S. 1946, Columbia University	M.
Rohlfing, Owen Eugene	Me.	Rodman, Milton Eugene	
Rohlfing, Paul Paul	D.C.	Rodman, Patricia (Patricia, Jr.)	P.
Rohlfing, Robert Arthur (L.)	Me.	A.B. 1946, Johns Hopkins University	P.
B.S. 1944, University of Iowa	Wash.	Rodman, John Chester	Hart.
Rohlfing, Robert Parker	Va	Rodman, John	
B.S. 1946, The George Washington		Rodman, Joseph A. William (L.)	Me.
University		Rodman, Joseph Van	P.
Rohlfing, Sally Anne	D.C.	A.B. 1946, Columbia	N.C.
B.B.A. 1946, M. Ed. 1946, Missouri College		Rodman, David Mark	
Rohlfing, William Glenn	D.C.	Rodman, John Frederick	
A.B. 1946, The George Washington		A.B. 1946, New York State Teachers	
University		College, Warren	Va
Rohlfing, Eugene Howard	Me.	A.M. 1946, University of Nebraska	
B.B.A. 1946, Lincoln University at		Rodman, John	P.
Maryland		Rodman, John	P.
Rohlfing, James Louis, Jr. (M)	D.C.	Rodman, Virginia Mae	N.C.
A.B. 1946, Boston University		Rodman, Anna Louise (L.)	
J.D. 1949, The George Washington		Rodman, Anna Louise (L.)	
University		A.B. 1946, University of California	M.
Rohlfing, Martha Ruth	D.C.	Rodman, Stephen (L.)	P.
B.S. 1946, Pennsylvania's College		Rodman, John (L.)	P.
M.S. 1946, American Union Teachers College		Rodman, Robert (L.)	P.
Rohlfing, John Theodore (L.)	Wash.	B.B.A. 1946, University of Nebraska	
A.B. 1945, M.S. 1946, University of		Rodman, John	P.
Washington		Rodman, Mary L.	
B.S. 1946, University of Illinois		Rodman, Anne F.	
M.D. 1946, University of Minnesota	D.C.	B.S. 1946, Concord College	
Rohlfing, Daniel Lawrence, Jr.			

Students Registered

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Roscoe, Joseph H.	Ky	Rosenberg, Chris Prinity	Va
Roscoe, John Fletcher III (L.)	Md	A.B. 1949, Amherst College	
Roscoe, Leonard Arnold	D.C.	Rosenfeld, Thomas Hanna (L.)	R I
Roscoe, Edward George	Va	A.B. 1941, Providence College	
Roscoe, Marjorie (M)	N Y	Rosenfeld, Sidney	N Y
A.B. 1954, New York University		Rosenfeld, T. J. (L.)	N.Y.
Roscoe, Catharine Leland	Va	A.B. 1947, Franklin College	
Roscoe, Joseph Paul	Pa	A.M. 1946, New York University	
A.B. 1952, The George Washington University		Rosenfeld, David	I.C.
Roscoe, Michael		Rosenfeld, Eugene P.	Md
Roscoe, Keith Bradford (L.)	W Va	Rosenfeld, Gerald Franklin	M
B.S. 1947, University of Utah	Utah	Rosenfeld, Marjorie	I.C.
Roscoe, Marjorie		Rosenfeld, Mary E.	I.C.
B.T. 1942, Clarkson College of Technology	Va	A.B. 1949, The George Washington University	
Roscoe, George Henry (L.)		Rosenfeld, Robert L. (L.)	M
A.B. 1939, University of Florida	Fla	A.B. 1937, University of North Carolina	
L.B. 1940, The George Washington University		A.M. 1947, American University	
Roscoe, Marjorie Kathleen		Rosenfeld, Irving Emanuel	Va
Roscoe, Anne Marie	Md	E.C.E. 1946, New York University	
Roscoe, John Joseph	I.C.	Roscoe, Norman (L.)	I.C.
Roscoe, Kenneth Henry	D.C.	A.B. 1943, Ford College	
Roscoe, Marjorie	Va	Rosky, Albert Steven	D.C.
B.S. 1949, Michigan State College	D.C.	Ross, Alice Ruth	D.C.
Roscoe, Thomas Mervin		A.B. 1954, Princeton College	
Roscoe, John Frank (L.)	Va	Ross, Andrew May	Calif
A.B. 1940, Princeton University	Va	Ross, Charles Bruce	N.C.
A.M. 1942, Tulane College		Ross, David Gray	I.C.
Roscoe, Helen Allen		Ross, Jacqueline Sue	Ky
A.B. 1942, University of Iowa	Va	Ross, Kip	I.C.
Roscoe, Marjorie Anne	Ill.	Ross, Malcolm	Md
A.B. 1944, University of Sao Paulo	Brazil	B.S. 1951, Utah State Agricultural College	
Roscoe, John Reed		Ross, Martin Randall	Md
B.S. 1942, University of Denver	D.C.	A.B. 1949, University of Connecticut	
Roscoe, Joseph Anthony		M.S. 1951, University of Michigan	
Ross, Alexander Lewis	N.J.	Ross, Richard Alfred	Mass
A.B. 1934, A.M. 1936, Wayne University	D.C.	A.B. 1941, Marquette College	
Ross, Edwin	N Y	Ross, Richard Howard	Texas
B.S. 1934, Yale University		Ross, Vernon Eugene	I.C.
Ross, Harry Joseph		Ross, William Morris	I.C.
B.S. 1948, St. Francis College	Md	Rosseter, Ross Edmund	I.C.
M.S. 1942, University of Maryland		Rosseter, William Herbert	W.V.
Ross, Robert Knutson		A.B. 1943, Lafayette College	
Ross, Herbert Harry	D.C.	Rosseter, Robert Lyman	Va
B.S. 1946, The George Washington University	D.C.	Ross, Joseph Robert	I.C.
Ross, Richard James		Ross, Carolyn Alma	Va
Ross, Ruth (L.)	N Y	Rosseter, Margaret Rose (M)	Calif
B.S. 1941, The George Washington University	D.C.	A.B. 1947, University of California	
Ross, John Virginia Lee		Ross, John Emerson	Va
Ross, John William Arthur	ArA	Ross, Norman James I.	Md
B.S. 1941, The George Washington University	D.C.	B.S. 1943, Tulane University	
L.B. 1947, H. M. 1942, John Marshall College		Rosseter, Murray Ferguson	D.C.
Rosseter, David May		Rosseter, Richard Herbert (L.)	N Y
Rosseter, Frank	D.C.	B.S. 1946, The George Washington University	
Rosseter, George John	Md	Rosseter, Martha Margaret (L.)	Va
Rosseter, Herman Lewis	I.C.	A.B. 1944, Georgetown University	
Rosseter, Joseph Louis	I.C.	B.S. 1944, M. B. 1945, The George Washington University	
Rosseter, Ross Rima	D.C.	Rosseter, Ross Morris, Jr.	N.Y.
Rosseter, Mary Jane	I.C.	Rosseter, Florence Frank	D.C.
A.B. 1942, The George Washington University	Va	J.M. 1941, Harvard University	
Rosseter, Harry Maier	N Y	Rosseter, John Allen (L.)	Va
B.S. 1948, M.S. 1953, The George Washington University		B.S. 1946, Northwestern University	
Rosseter, Marvin Bruce		Rosseter, Norman	Md
Rosseter, Harvey (L.)	D.C.	B.S. 1946, M.S. 1947, The George Washington University	
B.S. 1941, University of Maryland	D.C.	Rosseter, Gilbert Francis (L.)	Md
		Rosseter, Mary University of Maryland	
		Rosseter, Linda Edward	Va
		B.E.E. 1942, University of Maryland	N.Y.
		Rosseter, Edward Steven	

Randolph, Mary Moore	Va	Rubin, Sam	Va
Randall, Robert Dennis	Va	Rumple, Robert Paul	Md
Ransom, Charles B.	D.C.	Rush, Sam	N.Y.
Ransom, James Maynard (L.)	Ohio	Rush, Anna Emily	Md
A.B. 1940, University of California		Rush, John Vinton	Ind
in Los Angeles		R. L. Robert Ewing	D.C.
Ransom, John Lawrence	Va	Rubin, Howard Leonard	Md
Randall, Helen George	D.C.	Russ, Elizabeth	Md
Ransom, Michael Joseph	Md	Russ, Frank M.	Va
A.B. 1931, The George Washington		Russ, Robert A.	Va
University		Randall, Harold Chester	Va
Ransom, Roger Franklin	Conn.	Russ, R. Lee William	Va
Rand, George Frederick	Md	Russ, Lewis	W.Va
Rand, Harold Martin	Pa.	Russ, Monte Lee	Ind
Rand, Hubert Eugene	Va	Russ, Charles Kenneth	Ind
B.S. 1936, Michigan State College		Ruppel, Elia A.	Ind
Rand, James William	S.C.	A.B. 1931, University of Florida	Va
A.B. 1931, Vanderbilt College		Russ, John Lawrence	Ind
Rand, Mary Carter	Md	Russ, Thomas John Jr.	Ind
Rand, William Matthews	Md	Russell, Louis August	Va
B.S. 1931, University of Maryland		Russ, David Francis Jr.	Ind
Rand, William C.	D.C.	Russ, Arthur (L.)	
A.B. 1928, LL.B. 1930, LL.M. 1932,		Marion, Indiana, University of	
The George Washington University		Law	
Rand, Wiley Taylor	La.	Tracy, John (1917), UNRRA	Ind
Rand, Thomas Howard	Va	University, M. B. Gentry	Ind
Randall, Eugene Tracy	Md	Russ, Robert Henry	Ind
A.B. 1931, Lawrence University		Russ, Robert Lee (L.)	Ind
Randall, Harold Edgar	N.J.	A.B. 1931, University of Nebraska	Ind
B.S. 1931, Trinity College		Russ, Gerald Louis	Md
Randall, Arthur Lee	Va	Russ, Gerald Norman	Va
Rand, Monte Deland	W.Va	Russ, John Robert	Ind
Randall, Michael Joseph (L.)	Va	Russ, Howard Ann	
B.S. 1937, University of New		Russ, Howard Harold Jr.	
Hampshire		A.B. 1932, University of Maryland	
Randall, John Lee	D.C.	A.M. 1932, The George Washington	
Randall, Robert Sanford	Va	University	
Rand, Eugene Henry Jr. (L.)	Md	Russell, James Miler (L.)	
B.S. 1930, Yale University		A.B. 1930, The George Washington	
Rand, John	D.C.	University	
Randall, Sam	Va	Russell, John Alan	
B.S. 1911, College of the City of		Russ, John Bruce	
New York		Russ, Samuel Hor	
Rabin, Anita Gaye	N.J.	F.M.L. 1942, The George Washington	
Rabin, George (L.)	Pa.	University	
A.B. 1911, Pennsylvania State		Russ, William Augustine, II	
University		Russ, William John	
Rabin, Joseph Vilas	Va	Russ, William Maurice	
Rabin, Mary	D.C.	Russ, William Howard	
B.S. 1913, College of the City		A.B. 1913, LL.M. 1918, Oklahoma	
of New York		City University	
Rabin, William Arnold	Md	A.M. 1918, The George	
B.S. 1913, University of Maryland		Washington University	
Rabin, Robert	Md	Russ, William John	
Rabin, William	Md	B.S. 1918, Indiana State University	
A.B. 1931, University of Missouri		Russ, John Henry (L.)	
Rabinowitz, John Louis (L.)	Ind	B.S. 1934, Franklin and Marshall	
B.S. 1931, University of Illinois		College	
Rabin, Carl Eugene	D.C.	Russ, J. J. (L.)	
Rabin, Yim	D.C.	B.S. 1911, University of Maryland	
A.B. 1931, Los Angeles, New Mexico		Russell, John A. (L.)	
University		Russell, John A. (L.)	
Rabin, John (L.)	Va	A.B. 1911, University of Maryland	
Rabin, Joseph Lee	N.Y.	Russell, John A. (L.)	
Rabin, Arthur Thomas	Va	A.B. 1911, University of Maryland	
Rabin, Sam	Md	Russell, John A. (L.)	
Rabin, Arthur Gene	Md	A.B. 1911, University of Maryland	
Rabin, Sam	W.Va	Russell, John A. (L.)	
Rabin, William Ann	Md	A.B. 1911, University of Maryland	
Rabin, Samuel Lee	Va	Russell, John A. (L.)	
Rabin, Michael C.	Va	A.B. 1911, University of Maryland	
Rabinowitz, William Paul	D.C.	Russell, John A. (L.)	
Rabinowitz, John Alexander	D.C.	A.B. 1911, University of Maryland	
Rabin, Arnold James	Va	Russell, John A. (L.)	

Students Registered

550

[illegible]

[illegible]

Students Registered

561

[illegible]

[illegible]

Shelton, Catherine Mary	D.C.	Shlesinger, Bernard Edward, Jr. (L)	Va
Shelton, Frances Lee	N.C.	B.S. Chem. 1948, College of the	
Shelton, Joseph William	Va	Holy Cross	
Shelton, Joseph Forrester	I.C.	Shlosaker, Charles Edwin	Pa
Shelton, Harold Louis	I.I.	Shlosaker, David (L)	Pa
Shelton, Shirley Lelean	Va	B.S. in Ed. 1944, Pennsylvania State	
A.B. 1942, A.M. 1944, The George		Teachers College	
Washington University		Shlosaker, Franklin Sherman	Va
Shelton, Sally Emma	D.C.	Shlosaker, Mary Barbara	Mo
Shelton, Jack M. M. Jr.	I.I.	Shlosaker, Patricia L.	Pa
Shelton, Philip Barclay	N.Y.	Shlosaker, Robert Frank	I.C.
A.B. 1942, Haverford College		Shlosaker, Wayne Phillip	Va
A.M. 1944, University of Pennsylvania		Shlosaker, Jack Lawrence	
Shelton, Richard Graham	Mo	B.S. M.S. 1948, Rensselaer Polytechnic	
B.S. 1942, Northwestern University		Institute	
Shelton, Robert Galkaya	Bermuda	Shlosaker, Eugene L.	N.Y.
B.S. 1941, Southern College		Shlosaker, William Paul	I.C.
Shelton, Lionel Murray	Va	B.S. 1944, Western Teachers College	I.C.
Shelton, Virginia Mae	Tex.	Shlosaker, David Matthews	M.
A.B. 1941, A.M. 1944, The George		Shlosaker, Charles J. Jones	Va
Washington University		Shlosaker, John Paul	Va
Shelton, Paul Charles	D.C.	Shlosaker, Carolyn Elizabeth	
B.E. 1941, Duke University		Shlosaker, Frank Everett	Me
Shelton, Robert Bonfield	Ohio	B.S. 1933, U.S. Naval Academy	
B.S. 1940, U.S. Naval Academy		Shlosaker, David Norman, Jr.	D.C.
Shelton, Robert Anthony	D.C.	B.S. 1944, John Brown University	Pa
A.B. 1940, The George Washington		Shlosaker, Aaron Albert	Va
University		Shlosaker, Neal Marjua	Me
Shelton, Susan	Calif.	Shlosaker, James Southern	D.C.
Shelton, William James	N.Y.	Shlosaker, John Eugene	
Shelton, David Milton	Me	Shlosaker, Wayne Allen, Jr.	
B.S. 1940, University of Maryland		B.S. 1944, The George Washington	
Shelton, Lee Stanley	Va	University	
Shelton, John	Va	Shlosaker, Robert Joseph	I.C.
Shelton, Frances E.	N.Y.	Shlosaker, Edward Monte	N.Y.
A.B. 1944, University of Vermont		Shlosaker, Herbert Owen	
Shelton, Harry Richmond	Va	Shlosaker, Ben Abram	Va
A.B. 1940, University of Colorado		A.B. 1943, Carver College	I.C.
Shelton, Neal	D.C.	Shlosaker, Frances Lillian	I.C.
Shelton, Richard Ralph	Va	Shlosaker, Robert Edral	
A.B. 1941, Loyola University		Shlosaker, Joel	I.C.
Shelton, Maude Irene	D.C.	B.S. 1943, University of Maryland	I.C.
Shelton, Maury K.	Va	Shlosaker, Marlene	I.C.
Shelton, Dorothy Ramon	Va	Shlosaker, Lowell	I.C.
A.B. 1941, Wesleyan College		Shlosaker, Robert Alton	I.C.
Shelton, Myron Paul	N.Y.	Shlosaker, Anthony Pierre	I.C.
Shelton, John Alexander	N.Y.	Shlosaker, Walter Case	N.Y.
Shelton, Edwin Kevin	D.C.	B.B.A. 1944, The George Washington	I.C.
Shelton, John Harrison	Va	University	
Shelton, Anne Louise	D.C.	Shlosaker, Gerald Albert	I.C.
Shelton, Edwin Robert	M.I.	Shlosaker, Mae Elizabeth	I.C.
Shelton, Harry David	I.C.	Shlosaker, Elmer Wayne	I.C.
Shelton, William George	D.C.	A.B. 1941, University of Iowa	
Shelton, Charles Felix (M)	Va	Shlosaker, Thomas Vernon	Va
Shelton, Robert Keith (L)	Hawaii	B.S. in Ed. 1944, Madison College	I.C.
A.B. 1946, University of Hawaii		Shlosaker, James Stuart	Me
Shelton, Robert	D.C.	Shlosaker, Peggy Jane	I.C.
Shelton, Robert	I.C.	Shlosaker, Ruth Yvonne	I.C.
A.B. 1941, American University		A.B. 1948, Ohio Wesleyan University	I.C.
Shelton, George Andrew	N.Y.	Shlosaker, Harry M.	I.C.
B.E.E. 1944, University of Akron		Shlosaker, John Lee	I.C.
Shelton, William Edward	Va	B.S. 1944, The George Washington	I.C.
Shelton, Virginia Ruth	Ohio	University	
B.S. in Ed. 1940, Ohio State University		Shlosaker, Robert Edward	I.C.
Shelton, William Bryant	D.C.	A.B. 1940, The George Washington	I.C.
B.S. 1941, The George Washington		University	
University		Shlosaker, Marie Louise	I.C.
Shelton, Paul Wells	M.I.	A.B. 1942, A.M. 1944, The George	I.C.
Shelton, George Alexander	Pa	Washington University	
Shelton, Robert L. Rice	Va	Shlosaker, James John	I.C.
Shelton, Anne Rose		Shlosaker, Edward	I.C.
		B.S. in Ed. 1944, Pennsylvania State	
		Teachers College, Kutztown	

Students Registered

565

Siemer, Virginia			
Sigma, Chester Peter, Jr. (L.)	NY	Simpson, Nathaniel Edward	Va
Sigma, 1942, Trinity College	LoC	A.B. 1944, The George Washington University	
Sigs, Luther Franklin		Simpson, Richard Franklin	LoC
A.B. 1948, Ed.M. 1954, Western Maryland College	Md	B.S.A. 1941, Westminster College	
B.S. 1940, Maryland State Teachers College, Towson		Simpson, William Karlton III (L.)	Md
Sivens, Henry Leonard		A.B. 1942, University of Maryland	
Sizer, Howard Everett, Jr.	Id	Sing, Henry, Jr. (L.)	Va
Sizer, James Robert	Md	B.S. 1941, East Tennessee State College	
Sizer, Mary Vincent	D.C.	Siskin, Ernst Maxwell	Md
Sizemore, Albert	Mo	A.B. 1949, Cornell University	
Sizemore, Albert	D.C.	Sizemore, Robert George	NY
A.B. 1944, The George Washington University	Md	Sizemore, Philip Whitelaw	LoC
Sizemore, Anthony		A.B. 1940, Tennessee University	
Sizemore, Lee		Sizemore, Philip	Philadelp
Sizemore, Eugene Luther	N.J.	A.B. 1941, University of the	
Sizemore, Howard	Va	Government	
Sizemore, Harold Bluth	D.C.	Sizemore, Richard Joseph	D.C.
Sizemore, Herbert Belden	Va	Chattanooga, Tenn.	D.C.
Sizemore, Jack Eugene	Md	Sizemore, Robert Eugene	Va
A.B. 1944, The George Washington University	LoC	A.B. 1942, University of Wisconsin	
Sizemore, Jerry Bernard		Sizemore, Richard	Md
Sizemore, Richard Alexander (L.)	D.C.	B.S. 1940, University of Miami	
Sizemore, Robert Eugene	Md	Sizemore, William Gertrude	Md
A.B. 1941, Eastern University		Sizemore, Harold Dean	Va
Sizemore, Robert Eugene (L.)		B.A.E. 1944, University of	
A.B. 1941, University of Virginia	Va	California	
Sizemore, Stanley Leonard		Sizemore, Laura	Ark
B.S. 1941, University of Maryland	Md	Sizemore, Ralph Jack, Jr.	Colo
Sizemore, Elie (L.)		A.B. 1940, University of Colorado	
A.B. 1941, New York University	D.C.	Sizemore, Donald Edward	D.C.
Sizemore, Mary Lee		Sizemore, Edward P.	Md
Sizemore, Ruth Elizabeth (L.)	D.C.	Sizemore, Sarah Maria	Va
B.B.A. 1947, College of the City of New York	NY	B.S. 1945, Madison College	
Sizemore, James (M)		Sizemore, Louis (L.)	D.C.
B.S. 1944, Western Reserve University	Ohio	L.L.B. 1940, University of Sofia	
Sizemore, Arthur Joseph		L.L.B. 1940, University of Innsbruck	
Sizemore, Eugene J.	D.C.	Sizemore, Harold Mary	D.C.
Sizemore, John Thomas, Jr.	LoC	Sizemore, Joseph Arnold	D.C.
Sizemore, Francis Ann	Md	A.B. 1944, A.M. 1945, McGill University	
Sizemore, Francis Ann	D.C.	M.P.A. 1944, Ph.D. 1945, Harvard University	
A.B. 1940, Ball State University	D.C.	Sizemore, Marvin Philip	D.C.
Sizemore, Ralph Albert		Sizemore, Samuel Paul	D.C.
B.S. 1940, University of Maryland	Md	Sizemore, Henry Thomas, Jr. (L.)	Md
Sizemore, Arthur Paul		B.S. 1940, University of Maryland	
Sizemore, Charles William	LoC	Sizemore, George Ruff	Md
Sizemore, Edwin Frederick	Va	A.B. 1940, University of Maryland	
Sizemore, Jack	D.C.	Sizemore, David James	NY
L.S. in Ed. 1940, M.S. in Ed. 1940, Tennessee University	D.C.	B.S. 1941, College of the City of New York	
Sizemore, Joseph	D.C.	A.M. 1945, The George Washington University	
Sizemore, Mary	D.C.	Sizemore, Lucille Edwards	Md
Sizemore, Daniel, Jr.	Md	Sizemore, John Lynn (L.)	LoC
A.B. 1941, A.M. 1941, Boston University		A.B. 1945, Eastern University	
Sizemore, Joseph Russell	Md	A.M. 1940, University of	
Sizemore, Joseph Russell	Md	Philadelp	
Sizemore, Joseph Russell	Md	Sizemore, Edwin McGinn, Jr.	Va
Sizemore, Joseph Russell	Md	LoC, Robert Hadden (M)	W.Va
Sizemore, Joseph Russell	Md	Sizemore, David (L.)	Wash
Sizemore, Joseph Russell	Md	A.B. 1941, University of Washington	
Sizemore, Joseph Russell	Md	Sizemore, Robert A.	Pa
Sizemore, Joseph Russell	Md	A.B. 1940, George Washington University	Md
Sizemore, Joseph Russell	Md	Sizemore, John Parker	Pa
Sizemore, Joseph Russell	Md	A.B. 1940, Eastern University	
Sizemore, Joseph Russell	Md	Sizemore, David McAd	D.C.
Sizemore, Joseph Russell	Md	B.S. in Ed. 1941, Northeast Missouri State Teachers College	
Sizemore, Joseph Russell	Md		

Students Registered

517

[illegible]

51.0)

[illegible]

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Students Registered

571

[illegible]

Students Registered

573

Tarawa, Hajime William (I.) A.B. 1950, University of California at Los Angeles	Calif	Taylor, Frank, Jr. A.B. 1939, Marquette University	Ga
Li, B. 1954, Li, M. 1954, The George Washington University		Taylor, Frederick James Taylor, George Elliot	Va
Tatuk, Roland Henry A.B. 1952, University of Wisconsin A.M. 1955, The George Washington University	Wis	B.S. 1952, M.S. 1954, Marshall College	Va
Tate, Joe Louis (M) B.S. 1946, St. Mary's College M.S. 1948, Ph.D. 1954, The George Washington University	Clara	Taylor, Campbell, Hattie, Jr. Taylor, Jack (G. Hart) Taylor, James O'Neil	Va W.Va
Tatona, Fred B.S. 1944, University of Utah	Va	Taylor, James Robert (L) A.B. 1941, University of Chicago	Va D.C.
Tatner, Bernard Martin (L) B.S. 1954, University of Utah	Utah	Taylor, John Henry B.S. 1952, Howard University	D.C.
Tatner, Robert Lee A.B. 1950, The George Washington University	D.C.	Taylor, John Milward A.B. 1944, Williams College	Va
Tatner, William H. (June) Taylor, Margaret Leonard A.B. 1954, Hunter College	N.Y.	Taylor, Kathryn L. A.B. 1952, Furber College	Me
Tatnow, Arthur Joseph Tatnow, Fred, Michael Tate, Louis Stewart Tate, Louis Stewart	Me	R.L.S. 1915, University of Illinois B.S. 1944, U.S. Naval Academy	Va
B.S. 1952, Maryland State Teachers College	Va	Taylor, Margaret Mae B.S. in Ed. 1951, Boston University	Va
Tatton, Samuel Tate, Nancy Monroe (MD) B.S. 1950, Wake Forest College	D.C.	Taylor, Mark Stratford Taylor, Nancy Lee	Me
Tatton, Meyer Tatton, Wendell, Bernard (L) A.B. 1954, Adelphi College	N.C.	Taylor, Norman Edward A.B. 1949, Boston University	Texas
Tatton, Walter, Bernard (L) Tate, Martin Jerome Tate, James Charles (L) A.B. 1958, Northwest Louisiana State College	Va	M.Ed. 1951, Southern Baptist Seminary	
Li, B. 1954, The George Washington University	D.C.	Taylor, Norman Robert (L) B.S. 1941, University of Maryland	D.C.
Tatton, Richmond James B.S. 1951, Fairleigh University	Me	Taylor, Patricia Anne Taylor, Thomas Frank (L)	Me
Tate, Claude Dean A.B. 1947, Hunter College	N.C.	Taylor, Valma Margaret A.B. 1948, University of Colorado	Ind
Tate, James Frank, Jr. A.B. 1950, Adelphi University	Va	Taylor, Walter Aime Taylor, William Gordon (L)	Me
Tate, Marion Jean Tate, Robert Harvey Tate, Lyle Lamont	Va	B.S. 1950, University of Mississippi	D.C.
A.B. 1951, Occident College for Women	Me	Taylor, Richard Lawrence B.S. in Ed. 1942, Miami Teachers College	D.C.
Tatton, Gladys Allison Tatton, Norman Tate, Patricia Ross	Va	Tellman, Harry Keith A.B. 1942, Colgate University	N.Y.
Tate, Robert George A.B. 1954, University of Cincinnati	D.C.	Tee, Richard Lee Tee, Richard Meador	Calif
Tate, Eugene Sue Tate, Audrey Flatt Tate, Robert Warren	Va	Tellman, Lawrence (M) Tatone, Harold Oscar	Me
A.B. 1942, University of Illinois A.B. 1950, A.M. 1952, University of Illinois	D.C.	A.B. 1944, Vanderbilt University Tempter, Frederick Bruce	D.C.
Tate, Louis Albert, Jr. Tate, Dorothy Jane A.B. 1943, Ross Institute M.S. 1947, Iowa State College	Va	Tempter, Milton B.S. 1950, Syracuse University	D.C.
Tate, Elizabeth Margaret	Me	Tempter, Ruth Carl Tempter, Benjamin Edward	Va
	Va	Tempter, Philip J. Tempter, Milton Lee (L)	N.Y.
		A.B. 1950, A.M. 1955, New York University	D.C.
		Tetlow, Leo Martin Tetlow, John Tracy	Va
		Tetlow, Stuart Vincent III Tetlow, Robert Nicholas	D.C.
		Tetlow, Arthur Richard Tetlow, Eugene Ray	D.C.
		Tetlow, Lyle Edward (L) B.S. 1950, University of Tennessee	W.Va
		M.S. 1950, West Virginia University	
		Tetlow, Fred Arthur Tetlow, Stanley Anthony	Va
		Tetlow, John Lee Tetlow, Florence Marie	D.C.
		Tetlow, Frank Louis Tetlow, Harry James	Me
		Tetlow, Gertrude Elizabeth Tetlow, Carol Rex	Va

Thoms, John Smith, Jr.	D.C.	Thompson, James Edward	N.M.
Thoms, Grace Augusta	Va.	B.S. 1950, University of New Mexico	
A.B. 1954, The George Washington University		M.S. 1951, University of Wisconsin	Md.
Thoms, Judith Rae	Md.	Thompson, James Howard	N.Y.
Thoms, Frederick Lynton	Md.	Thompson, John Anne	N.Y.
Thoms, Paul Montague	Va.	Thompson, John Burnett	N.Y.
Thoms, Corbin Salkover	Idaho	Thompson, John E.	N.Y.
Thoms, Leland Loomis	D.C.	Thompson, John Maurice	N.Y.
B.S. 1945, University of Minnesota		Thompson, John Constantine	
Thoms, William Gordon	Va.	B.S. 1941, The George Washington University	
Thoms, Edna Susan	D.C.	Thompson, Larry Wolford	W.Va.
Thoms, Eugene Harry	D.C.	Thompson, Leonard L. (L)	
Thoms, Eugene Stanley	D.C.	A.B. 1949, West Virginia University	D.C.
Thoms, Jane Hilda	Va.	Thompson, Mose Cotton	
A.B. 1940, Cornell University		A.B. 1941, Howard University	
Thoms, Anne	Burma	A.M. 1948, University of Chicago	
A.M. 1951, University of Minnesota		Thompson, Martin Theodore	Va.
Thoms, Beatrice R.	N.Y.	Thompson, Mary Louise	
Thoms, Patricia Anne	D.C.	Thompson, Mary Louise	
Thoms, Viola Marie	Gu.	B.S. 1944, The George Washington University	M.
Thoms, Fredrick Clayton	Md.	Thompson, Myles Paul	N.M.
A.B. 1951, Western Maryland College		Thompson, Nelson Zetta	
Thoms, Eliza	D.C.	A.B. 1941, A.M. 1941, University of Chicago	Va.
A.B. 1949, Hunter College		Thompson, Ralph Armstrong	Kan.
Thompson, John	D.C.	Thompson, Ralph Franklin	D.C.
Thompson, Bertha Christine	Va.	Thompson, Robert John	Va.
Thompson, Betty Jane	Pa.	B.S. 1947, Deake University	Va.
Thompson, David Conrad	Va.	Thompson, Sanatrice Edlen	Md.
Thompson, Paul Eliza	Md.	Thompson, Vaida Nadine Diller	
Thompson, Patricia Delaurent, Jr. (L)	Md.	Thompson, Vera Eileen	
A.B. 1949, Georgetown College		B.S. 1949, New York University	
Thompson, Gregory (H)	D.C.	Thompson, William, Jr. (L)	
Thompson, Howard Francis	D.C.	A.B. 1949, Howard University	N.Y.
Thompson, Jack L.	D.C.	Thompson, Evelyn Jean	Va.
Thompson, James Hays	Ind.	Thompson, John Richard	
A.B. 1949, Wake Forest College		Thompson, Robert Lee	
Thompson, James Christopher	Calif.	A.B. 1952, The George Washington University	M.
Thompson, John William	Va.	Thompson, Robert Malcolm	D.C.
Thompson, Jane Wanda	D.C.	Thompson, Somthob	Md.
A.B. 1948, Morris Brown College		Thompson, Le Musey	Md.
M.S. 1950, Alcorn University		Thompson, Watson III	Md.
Thompson, Lee	Pa.	Thompson, William Everett	Va.
Thompson, Lloyd H. (L)	Md.	Thompson, Elizabeth Meyer	Calif.
A.B. 1949, Idaho College		Thompson, Philip Moore	Va.
Thompson, Martha Conner	Va.	Thompson, Mary Hunter	D.C.
Thompson, Percy Westwood	D.C.	Thompson, Ruth Eugenia	Md.
A.B. 1949, Fordham University		Thompson, Valery	
Thompson, Raymond Edward	D.C.	Thompson, Anne Crawford	
Thompson, Raymond William	Pa.	A.B. 1949, A.M. 1941, Tulane University	D.C.
Thompson, Richard Lee	Va.	Thompson, Carter Nicholas	D.C.
Thompson, Riley Russell	Ala.	Thompson, Louis Garnet	Md.
Thompson, Robert Lawrence	Pa.	Thompson, Louis Nicholas	
B.S. 1944, Pennsylvania State University		Thompson, James Russell	Va.
Thompson, Roy Charles	Tenn.	A.B. 1949, University of Maryland	
Thompson, Ruth Lee	D.C.	Thompson, Irving Russell (L)	N.Y.
Thompson, V. John Elmer	Va.	A.B. 1952, Wabash College	Va.
Thompson, Allen Glenwood	Va.	Thompson, James Clinton	Va.
B.E.F. 1944, Montana State College		Thompson, John N. (L)	
Thompson, Dorothy Moore	D.C.	B.S. 1946, U. S. Merchant Marine Academy	
Thompson, Elmer Anne (L)	Pa.	B.S. 1949, Georgetown University	Md.
B.O.F. 1941, Furber University		Thompson, Alice Janet	
Thompson, Eugene Christensen, Jr.	Va.	A.B. 1949, Denison University	
Thompson, Eugene Deaton	D.C.	A.M. 1948, Northwestern University	
Thompson, Frank Joseph	N.Y.		
B.E.F. 1944, Loras University			
Thompson, Frederick Louise	D.C.		
Thompson, Garland Frances (L)	D.C.		
Thompson, Harry LeRoy, Jr.	Pa.		
B.S. 1944, U. S. Naval Academy			

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Towson, Robert Fenn, Jr.	M4.	Tucker, Jane Clay	W Va.
A.B. 1952, M.P.A. 1952, The George Washington University		A.B. 1958, Mary Baldwin College	Ga.
Toye, Robert Lloyd	Md.	Tucker, Ray Bryant	Ar.
B.S. 1955, Virginia Polytechnic Institute		B.S. 1953, University of Georgia	
Tice, Mary Margaret	Md.	Tucker, Simon (L.)	
Tiffin, Leonard Robert	D.C.	B.S. 1949, College of the City of New York	
B.S. 1942, University of Maryland		M.P.A. 1943, New York University	
Tyler, George Washington	Md.	L.D. 1949, The George Washington University	Va.
Tyler, Donald George	Md.	Tucker, William Clarke	Va.
Tyler, Ding Nease	D.C.	Talbot, John Bailey	Calif.
Tyler, Arnold Jay	D.C.	Talbot, John Ellen	
Tyler, Leonard	Va.	Talbot, William John	
Tyler, Pauline Catherine	Va.	B.S. 1951, University of Illinois	
A.B. 1954, University of Maryland		M.S. 1951, University of Wisconsin	Colo.
Tyler, William Robert	Md.	Tand, Louis Edward, Jr.	I.
Tyler, Esther Tacey	Md.	Tall, Theodore Thomas	
A.E. 1955, A.M. 1918, The George Washington University		B.E. 1955, University of Cincinnati	Md.
Tyler, William Leonard (L.)	Md.	Tanner, William William, Jr.	
B.S. 1911, U.S. Marine Academy		A.B. 1913, Tulane University	
Tyler, William (L.)	N.Y.	M.S. 1915, The George Washington University	W Va.
Tyler, Margaret Ann	Va.	Tanner, John Macdonald (L.)	N.Y.
A.B. 1953, Tulane and Henry College		Tanner, George Allen	Va.
Tyler, Robert Lawrence	N.C.	Tanner, Billy Leslie	Pa.
Tyler, Paul Ernest	D.C.	Tanner, Gerald Lester	
Tyler, Henry A.	Md.	Tate, James Vincent (L.)	R.I.
Tyler, William Forrest (L.)	Va.	B.S. 1953, Ohio University	
B.S. 1949, Georgetown University		Tate, Edward Vincent	
Tyler, Henry Schuyler	N.Y.	Tate, Charles Louis	
Tyler, James Clarence (L.)	Md.	A.B. 1919, The George Washington University	Md.
B.A. 1911, New York University		Tate, Ernest K.	
Tyler, Edward George	Va.	Tate, George (L.)	
A.B. 1917, Wayne University		Tate, George	
Tyler, Patricia Gail	D.C.	Tate, George	
Tyler, William Jennings	D.C.	Tate, George	
Tyler, Robert Augustus, Jr. (L.)	Md.	Tate, George	
A.B. 1951, The George Washington University		A.B. 1918, Cornell College	Va.
Tyler, Ronald George (L.)	Va.	Tate, Frederick	
B.S. 1911, University of New Hampshire		Tate, John James	
Tyler, Charles Henry (M)	D.C.	B.S. 1913, U.S. Merchant Marine Academy	Pa.
A.B. 1914, The George Washington University		Tate, John Owen	
Tyler, Carl Mae	Kan.	Tate, John Walter	
Tyler, John Lyle	D.C.	B.S. 1948, U.S. Merchant Marine Academy	I.C.
Tyler, Harold White	Va.	Tate, Mary Joseph (L.)	N.Y.
Tyler, George Schenck	Va.	A.B. 1911, The George Washington University	
Tyler, John Paul	D.C.	Tate, Nancy Elizabeth	
B.E. 1942, University of Idaho		Tate, Robert	
Tyler, Emmett Fred	Calif.	Tate, R. W. W. W. W. W.	
Tyler, David	D.C.	Tate, Samuel	
A.B. 1911, Western Maryland College		Tate, Samuel	
Tyler, Paul Joseph	Pa.	Tate, Samuel	
Tyler, Nick	Pa.	Tate, William Joseph (L.)	
Tyler, John Frank	Va.	B.S. 1918, University of Michigan	
A.B. 1919, University of North Carolina		Tate, William Freeman	
Tyler, Steven Frederick	D.C.	F.L.E. 1919, Tulane University	
Tyler, Neilson Theodore (M)	Pa.	Tate, Anthony Joseph	
A.E. 1913, Ohio University		Tate, Stephen	
Tyler, William Anthony	Pa.	B.S. 1947, Western Kentucky College	N.Y.
Tyler, Edward Earl	Va.	Tate, Ann Marie	
Tyler, Norman	D.C.	Tate, Lee	
Tyler, Donald Joseph	N.Y.	B.S. 1948, University of Missouri	
Tyler, Michael	Md.	Tate, Sylvia	
Tyler, Gerald (L.)	Md.	Tate, George	
A.B. 1911, Western University		A.B. 1911, Boston Southern University	
Tyler, Edward Lee	Md.	M.A. 1911, Ohio State University	
Tyler, Peter George	Md.	Tyler, William	
		B.S. 1911, Florida State College	

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Walsh, Jane Angela	D.C.	Wardner, Laura Elizabeth	Conn
B.S. 1918, The George Washington University		A.B. 1912, University of Connecticut	Va
Walsh, John Leonard	Tenn	Ware, Herbert Withers	Md
A.B. 1920, Catholic University of America		Ware, Robert Lewis	Md
Walsh, Richard Francis	N.Y.	Watson, R. Howard Rivers	
A.B. 1921, Syracuse University		A.B. 1922, The George Washington University	
Walt, Dorothy Elizabeth	Va	Watford, Mahood	Md
A.B. 1921, University of California at Los Angeles		Watkins, Robert Patterson (I.)	
A.M. 1926, State University of Iowa		A.B. 1925, Boston University	Va
Walters, Clara Caroline	Pa.	M.B.A. 1924, Harvard University	Pa
Walters, Clyde Marvin	Pa.	Wattson, Andrew Lee	Va
B.S. 1921, Johnson Valley College		Wattson, Francis Elizabeth	Pa
Walters, Raymond Ward, Jr.	D.C.	Wattson, Howard (F.)	
B.S. 1919, The George Washington University		Wattson, Nancy Nellie (L.)	
Walters, Albert Norman	D.C.	A.B. 1911, Catholic University of America	Va
Walters, Fred Thomas	Tenn	Wattson, Percy	Va
Walters, Frank John	D.C.	Wattson, Frank Randall	Pa
Walters, Morris Paul	Va	Wattson, Louis H. (I.)	D.C.
B.M.E. 1924, Lehigh University		Wattson, Margaret Elizabeth	Md
Walters, Richard	Va	Wattson, Mary Emily	S.D.
B.S. 1916, University of Virginia		Wattson, Mary Perry	D.C.
Wattall, David Barclay	D.C.	Wattson, Virginia Caroline	
Watt, Clifford	Va	A.B. 1921, The George Washington University	Pa
A.B. 1921, Reed College		Warren, William Curtis	Md
Watt, Thomas McQuinn (M)	Calif	B.S. 1927, University of Florida	
A.B. 1921, Washington College		Wassak, Louis Frederick (M)	
Watt, David Arthur	Ohio	A.B. 1924, The George Washington University	Va
A.B. 1921, Mount Union College		Wassak, Albert Frederick	
Watt, Lawrence Mason (L.)	Md	B.S. 1921, Johnson C. Smith University	D.C.
B.S. 1920, Virginia Polytechnic Institute		Wattson, Leonard	Va
Watt, Sara Patricia	Va	Wattson, William Victor	
Watt, Thomas William, Jr.	Md	Wattson, Albert Brooks, Jr.	Calif
A.B. 1919, The George Washington University		A.B. 1920, Dartmouth College	
Wattson, Katherine Ann	D.C.	Wattson, Steve	
A.B. 1911, The George Washington University		A.B. 1921, Oklahoma Agricultural and Mechanical College	S.
Wattson, Fred Charles	N.Y.	Wattson, Francis Marvin	N.Y.
B.S. 1918, M.S. 1918, College of the City of New York		B.S. 1921, Washington College	
Watt, Chas. George (M)	N.Y.	Wattson, William Adrian	Va
B.S. 1921, Iowa State College		A.B. 1921, University of Vermont	
Watt, Hugh Otto	Illinois	Wattson, Beverly Ann	Calif
Watt, William Chas. W.	Md	Wattson, Donald Edward	
A.B. 1921, Northern Western University		Wattson, Robert Vernon (I.)	
A.M. 1921, Yale University		A.B. 1914, The George Washington University	Md
Watt, William Charles	Pa.	Wattson, Adelaide Lucille	Va
Watt, James Walter	Va	Wattson, Guy Van Vorst	Md
A.B. 1921, University of Georgia		A.B. 1911, The George Washington University	
Watt, Frederick George, Jr. (I.)	D.C.	Waterman, John C.	D.C.
A.B. 1921, Yale University		A.B. 1923, Clark University	Pa
B.S. 1919, Clark College of Law		Waters, Florence Ann	D.C.
Watt, Gordon Homer (I.)	Md	Waters, Louise Fletcher, Jr.	Pa
B.S. 1921, University of Maryland		B.S. 1921, Clark College	Md
Watt, Jack Lee	D.C.	Wattson, Harry Lawrence	Pa
Watt, John Milton	D.C.	Wattson, Alfred Eugene	Md
Watt, John Wesley	Va	Wattson, Harold Seamus	Pa
B.S. 1921, The George Washington University		Wattson, John (I.)	Va
Watt, Robert F. M. (I.)	Calif	Wattson, Leland Arthur	Pa
B.S. 1921, U. S. Naval Academy		A.B. 1921, University of Maryland	
Watt, Sally Marie	D.C.	Wattson, Mary Ford	
Watt, William Albert	D.C.	Wattson, Roger Russell	
Watt, Edith Maylin	D.C.	B.S. 1921, Pennsylvania State University	

Students Registered

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Williams, William Cresswell	Va	Williams, Wynatha Floyd	Wv
A.B. 1924, The George Washington University		P.H. 1924, Wisconsin State College	M
Williams, H. Lee	Va	Williams, Wynne Moore	
A.B. 1921, George College		A.B. 1921, University of Utah	
Williams, Ralph Emerson	Md	M.F.A. 1924, The George Washington University	
Williams, Edgar (Fleming, L.)	Md	Williams, Clara Powell	Ar
A.B. 1924, Pennsylvania Military College		Wm. Clara Fowler (L.)	Ar
Williams, Gordon Robert	D.C.	W. S. 1924, Rose Polytechnic Institute	D.C.
A.B. 1924, Boston University		Williams, Frank J.	Ar
Williams, John Russell	Va	A.B. 1924, University of Alabama	Va
Williams, Milton Lawrence	Utah	Wm. Howard Allen, Jr.	Ar
Williams, Charles Anne	D.C.	Williams, Elmer Harry	
Williams, John I.	Va	B.S. 1924, Oklahoma Agricultural and Mechanical College	Ar
Williams, M. Marcus	Va	Williams, James Taylor	Ar
Williams, Mary Elnor	N.C.	Wm. James Taylor	Ar
Williams, Thomas Raymond	N.Y.	Wm. James Taylor	Ar
Williams, Carl J.	Id	Wm. James Taylor	Ar
B.S. 1924, A.M. 1924, The George Washington University		Williams, Robert Edward	W.Va
Williams, Thomas	Calif.	A.B. 1924, Mexico City College	Md
Williams, James Clarke	D.C.	Williams, James Brown	Mo
H.C.L. 1924, Colorado Agricultural and Mechanical College		Williams, John Robert Giddes	N.Y.
Williams, James Taylor	Va	Williams, John G. (L.)	
Williams, J. W. Whelan	Pa	B.S. 1924, University of Virginia	W.Va
A.B. 1924, The George Washington University		Wm. Lawrence Allen (L.)	
Williams, John Edgar	N.C.	B.M. 1924, Georgia Institute of Technology	W.Va
A.B. 1924, A.M. 1924, University of North Carolina		Williams, Robert W. Hart	Mo
Williams, John Edwards	Md	B.M. 1924, West Virginia University	Mo
Williams, John Harrison, Jr.	Va	Williams, Charles Robert (L.)	Ar
B.S. 1924, Wayne Teachers College		A.B. 1924, University of Maryland	Ar
Williams, John Henry	Md	Williams, Percy H. H.	Ar
Williams, Kathryn Anne (M.)	Pa	Williams, Percy H. H.	Ar
B.S. 1924, University of Pittsburgh		B.E.A. 1924, University of Miami	Ar
Williams, Katherine Elizabeth	Md	Williams, Arthur Moore	W.Va
Williams, Margaret Fleming	Md	Williams, Arthur Moore	W.Va
Williams, Marilyn Hope	D.C.	Williams, Arthur Moore	W.Va
A.B. 1924, Miami University		Williams, Arthur Moore	W.Va
Williams, Mary Elnor	Tenn.	Williams, Arthur Moore	W.Va
Williams, Mary Ann	Calif.	Williams, Arthur Moore	W.Va
Williams, Mary Elizabeth	D.C.	Williams, Arthur Moore	W.Va
Williams, Mary	D.C.	Williams, Arthur Moore	W.Va
Williams, Noel Earl, Jr. (L.)	N.D.	A.B. 1924, A.M. 1924, University of Colorado	D.C.
B.S. 1924, U. S. Coast Guard Academy		Williams, Thomas Moore	D.C.
Williams, Paul Moore	D.C.	A.B. 1924, Columbia University	D.C.
Williams, Richard Edward	Pa	Williams, Thomas Moore	D.C.
Williams, Richard Glen	H.C.	M. S. 1924, Southern University	Md
M.S. 1924, U. S. Military Academy		Williams, Thomas Moore	Md
M.S. 1924, University of Illinois		Williams, Thomas Moore	Md
Williams, Richard Nelson	Va	Williams, Thomas Moore	Md
Williams, Robert Alexander	Pa	Williams, Thomas Moore	Md
A.B. 1924, Washington and Jefferson College		Williams, Thomas Moore	Md
Williams, Robert Emory	Va	Williams, Thomas Moore	Md
Williams, Robert Emory (M.)	D.C.	Williams, Thomas Moore	Md
Williams, Robert	Pa	Williams, Thomas Moore	Md
Williams, Robert Paul, Jr.	Va	Williams, Thomas Moore	Md
B.M. 1924, University of Tennessee		Williams, Thomas Moore	Md
Williams, Thomas Robinson	Va	Williams, Thomas Moore	Md
A.B. 1924, The George Washington University		Williams, Thomas Moore	Md
Williams, Walter Arthur, Jr.	Va	Williams, Thomas Moore	Md
A.B. 1924, Lawrence College		Williams, Thomas Moore	Md
H.C. 1924, University of Wisconsin		Williams, Thomas Moore	Md
Williams, William Henry	Calif.	Williams, Thomas Moore	Md
B.S. 1924, University of Southern California		Williams, Thomas Moore	Md

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Wood, Dick Raymond	D.C.	Woo, Theodore C. (M)	D.C.
A.B. 1921, New York State Teachers College		Woo, William Neal (L)	M
Wood, Frederick Stephen	Mass	Woo, J. L. University of Maryland	W.V.
A.B. 1925, Colby College		Woo, John Chapman (L)	
Wood, John Murray	Md	A.B. 1924, Harvard College	M
Wood, John Lawrence	Va	Woods, Nancy Lee	
J.L.B. 1921, The George Washington University		A.B. 1912, West Virginia Institute of Technology	
Wood, James Henry, Jr.	Va	Woods, Emily Jean, Assistant	Tx
Wood, Katherine Louise	Md	Woods, Graham Warren	Mass
Wood, Louis Leonard	D.C.	Woods, Amy Marie	
B.S. 1921, University of Delaware		A.B. 1911, University of Missouri	Tx
Wood, Mark Louis	N.C.	Woods, John Lee	Va
Wood, Mary Meyer	Va	Woods, John M.S. 1921, University of Wisconsin	Va
A.B. 1921, Woodrow Wilson College		Woods, Joseph Thomas	Tx
Wood, Robert Kent	Tenn	A.B. 1921, University of Missouri	Tx
Wood, William Henderson	Tenn	Woods, Thomas Francis (L)	Va
Wood, Thomas Edward	W.V.	A.B. 1912, Washington College	Va
Wood, Anna Rachel	Tx	Woods, John Lee	Va
A.B. 1921, A.M. 1923, LL.B. 1925, The George Washington University		Woods, John Lee	Va
Woolley, Charles James	Md	Woods, John Lee	Va
Woolley, Frank Philip	Md	Woods, John Lee	Va
A.B. 1921, Indiana College		Woods, John Lee	Va
Woolson, Robert Ward, Jr.	Pa	Woods, John Lee	Va
B.S. 1921, Howard University		Woods, John Lee	Va
Wooten, William Rogers	D.C.	Woods, John Lee	Va
Wooten, William Henry	Va	Woods, John Lee	Va
Wooten, David William (L)	N.Y.	Woods, John Lee	Va
B.S. 1921, U. S. Coast Guard Academy		Woods, John Lee	Va
Woods, Franklin Bryant	D.C.	Woods, John Lee	Va
Woods, Robert James	D.C.	Woods, John Lee	Va
Woods, Thomas Albert	D.C.	Woods, John Lee	Va
B.C.E. 1921, American Institute of Technology		Woods, John Lee	Va
Woods, William Charles	Pa	Woods, John Lee	Va
Wooten, Joseph David (M)	D.C.	Woods, John Lee	Va
B.S. 1921, Pennsylvania College		Woods, John Lee	Va
Wooten, Walter Jerome	D.C.	Woods, John Lee	Va
B.S. 1921, U. S. Naval Academy		Woods, John Lee	Va
Wooten, William Wagoner	Va	Woods, John Lee	Va
B.S. 1921, Georgia College		Woods, John Lee	Va
Wooten, Kenneth Eugene	D.C.	Woods, John Lee	Va
B.M.C. 1921, The George Washington University		Woods, John Lee	Va
M.B. 1921, University of Maryland		Woods, John Lee	Va
Wooten, Ronald Lane	Md	Woods, John Lee	Va
Wooten, Howard Hampton (L)	Md	Woods, John Lee	Va
B.S. 1921, University of Minnesota		Woods, John Lee	Va
Wooten, Ronald Herbert, Jr. (M)	Va	Woods, John Lee	Va
A.B. 1921, The George Washington University		Woods, John Lee	Va
Wooten, Fred Joseph	N.Y.	Woods, John Lee	Va
Wooten, Hilda Epps	Mass	Woods, John Lee	Va
Wooten, Lee Harold Raymond	D.C.	Woods, John Lee	Va
Wooten, John M.	Md	Woods, John Lee	Va
B.S. 1921, University of Cincinnati		Woods, John Lee	Va
B.S. 1921, A.M. 1923, University of Missouri		Woods, John Lee	Va
Wooten, William Thomas	D.C.	Wooten, William Thomas	D.C.
Wooten, Margaret Chandler	D.C.	Wooten, William Thomas	D.C.
Wooten, Martin Joseph	Va	Wooten, William Thomas	D.C.
B.S. 1921, Washington Institute of Technology		Wooten, William Thomas	D.C.
Wooten, Charles Warren	Va	Wooten, William Thomas	D.C.
Wooten, Mary B.	Va	Wooten, William Thomas	D.C.
Wooten, George Francis	D.C.	Wooten, William Thomas	D.C.
Wooten, William R.	Md	Wooten, William Thomas	D.C.
Wooten, John Anthony	Mass	Wooten, William Thomas	D.C.
Wooten, Gerald Perry (L)	Md	Wooten, William Thomas	D.C.
B.M.C. 1921, Indiana University		Wooten, William Thomas	D.C.
Wooten, William Raymond II	W.V.	Wooten, William Thomas	D.C.
Wooten, Alexander Stephen	Va	Wooten, William Thomas	D.C.

Zamiatina, Vincent Getald	N Y	Zimmerman, Ernest Frederick	M
B.S. 1933, College of the City of New York		Zimmerman, Mary Gertrude	N Y
Zamiatina, Robert J.	N Y	Zimmerman, Susan Mary Mathias	P
Zamiatina, Albert Getald	Mass	Zimmerman, Robert Walter	Va
B.S. 1934, Massachusetts Institute of Technology		Zinn, Robert Lee	Ca
Zanger, William Donald	Calif	Zinn, Donald Edward (L.)	
Zang, J. Lawrence Eugene (M)	D.C.	B.M.E. 1934, Pennsylvania State University	Va
Zank, James Lewis	Va	Zink, Marjorie	
A.B. 1943, University of Minnesota		A.B. 1934, Reed College	Pa
Zarog, John (L)	D.C.	Zinn, Albert Roy	U.S.
B.E. 1934, West Virginia University		Zinke, David Homer	M
Zar, Percy Reed	Va	Zinsky, Victor	
Zar, James Benjamin	N.Y.	B.E. 1927, Rossvater Polytechnical Institute	Va
B.S. 1932, College of the City of New York		Zita, Grace Teresa	M
Zark, Henry Stanley	Va	Zitlow, Lewis Robert	Pa
Zar, John Joseph	D.C.	Zitlow, John	
Zaritsky, Eleanor M.	Va	A.B. 1931, The George Washington University	M
Zaritsky, Edna Grace	Va	Zitovsky, Henry J.	U.S.
Zaritsky, Margaret Carol	D.C.	Zitovsky, Nicholas Louis (M)	
B.A. 1947, College of the City of New York		B.S. 1931, Connecticut University	D.C.
Zaritsky, Charles Joseph	Va	Zitov, Donald Marshall	Pa
Zaritsky, Louis Raphael	Md	Zitov, Peter	
Zaritsky, Stuart	Md	B.S. in Ed. 1939, Pennsylvania State University	D.C.
Zaritsky, Kay Eugene	D.C.	Thesis on Culture, Shippensburg	D.C.
Zaritsky, Michael Arnold	Pakistan	Zitov, Harold Scott	M
Zaritsky, John James	N.Y.	Zitovitch, Edwin John	Pa
Zaritsky, Joseph Konrad	D.C.	Zitovitch, Yale Norman	
Zaritsky, Norman Isaac	Md	Zitovitch, Robert Gordon	Pa
Zaritsky, Robert Charles (M)	W.Va	B.S. 1933, St. Joseph's College	Pa
B.S. 1935, The George Washington University		Zitovitch, Carl Joseph	M
Zaritsky, Robert Frederick (L)	Mass	Zitovitch, Karl Joseph	Pa
B.C. E. 1931, Mount College of Music and Technology		Zitovitch, Arthur Samuel (L)	Pa
Zarz, Ed (L)	Md	B.M.E. 1936, Princeton University	Pa
B.S. in Ed. 1937, University of Nebraska		Zitovitch, Robert	Pa
Zaritsky, Stephen	D.C.	Zitovitch, Marie	Pa
		Zitovitch, Thomas	Pa
		Zitovitch, Mary	N.Y.
		A.B. 1941, Smith College	
		Zitovitch, Sandra Margaret	

SUMMARY OF REGISTRATION

1954-55

THE JUNIOR COLLEGE

	Men	Women	Total
Freshmen	575	454	1,029
Sophomores	652	425	1,077
Total	1,227	879	2,106

COLUMBIAN COLLEGE

Juniors	127	145	272
Seniors	260	121	381
Candidates for the degree of Master of Arts	125	122	247
Candidates for the degree of Master of Science	119	13	132
Unclassified	14	4	18
Total	595	475	1,070

GRADUATE COUNCIL

Candidates for the degree of Doctor of Philosophy	102	5	107
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THE SCHOOL OF MEDICINE

First Year	98	5	103
Second Year	84	5	89
Third Year	82	3	85
Fourth Year	52	1	53
Total	316	14	330

THE LAW SCHOOL

First Year	444	24	468
Second Year	292	17	309
Third Year	391	14	405
Candidates for the degree of Master of Laws	7	3	10
Candidates for the degree of Master of Comparative Law	12	—	12
Candidates for the degree of Doctor of Juridical Science	9	—	9
Unclassified	14	—	14
Total	1,269	58	1,327

THE SCHOOL OF ENGINEERING

	Men	Women	Total
Freshmen	246	2	248
Sophomores	179	1	180
Junior	117	1	118
Senior	128	1	129
Candidates for the degree of Master of Science	45	—	45
Candidates for the degree of Master of Engineering	—	—	—
Administration	133	—	133
Unclassified	24	—	24
Total	809	5	814

THE SCHOOL OF PHARMACY

	Men	Women	Total
Junior	18	2	20
Senior	24	1	25
Total	42	3	45

THE SCHOOL OF EDUCATION

	Men	Women	Total
Junior	63	4	67
Senior	70	34	104
Candidates for the degree of Master of Arts	196	13	209
Candidates for the degree of Doctor of Education	10	6	16
Unclassified	27	13	40
Total	381	281	662

THE SCHOOL OF GOVERNMENT

	Men	Women	Total
Junior	121	32	153
Senior	174	40	214
Candidates for the degree of Master of Arts	175	34	209
Candidates for the degree of Master of Business Administration	99	2	101
Candidates for the degree of Master of Personnel Administration	4	—	4
Candidates for the degree of Doctor of Business Administration	17	1	18
Total	587	109	696

THE DIVISION OF UNIVERSITY STUDENTS

	Men	Women	Total
University Students	2,97	1,429	4,397

THE DIVISION OF SPECIAL STUDENTS

	Men	Women	Total
Special Students	765	172	937

THE COLLEGE OF GENERAL STUDIES
(On Campus)

	Men	Women	Total
College of General Studies	36	57	93

SUMMARY

Students Registered, Academic Year 1954-55	12,451	5,196	17,647
Students Registered, Summer Session 1954	2,874	915	3,789
Total Registrations 1954-55	15,325	6,111	21,436
Duplicate Registrations	5,267	2,501	7,768
Total Number of Students Registered 1954-55*	10,058	3,610	13,668

DEGREES CONFERRED

Bachelor of Arts	322
Bachelor of Arts in Education	239
Bachelor of Arts in History	43
Bachelor of Arts in Government	111
Bachelor of Civil Engineering	11
Bachelor of Electrical Engineering	11
Bachelor of Law	19
Bachelor of Laws (National University)	180
Bachelor of Mechanical Engineering	30
Bachelor of Science	12
Bachelor of Science in Engineering	41
Bachelor of Science in Home Economics	8
Bachelor of Science in Pharmacy	4
Bachelor of Science in Physical Education	28
Doctor of Education	10
Doctor of Industrial Science	4
Doctor of Medicine	2
Doctor of Philosophy	80
Law Doctor	23
Master of Arts	15
Master of Arts in Education	51
Master of Arts in Government	52
Master of Arts in Personnel Administration	25
Master of Arts in Public Administration	4
Master of Business Administration	4
Master of Comparative Law	54
Master of Constitutive Law (American Practice)	5
Master of Engineering Administration	5
Master of Laws	1
Master of Science	20
	25

1,478

* The following figures for students registered in the Off-Campus Division of the College of General Studies are not included: 1,400 men, 1,400 women, total 2,800.

GEOGRAPHICAL DISTRIBUTION OF STUDENTS
UNITED STATES, TERRITORIES, AND POSSESSIONS

Alabama	60	Nebraska	12
Arizona	14	New Hampshire	16
Arkansas	10	New Jersey	180
California	162	New Mexico	10
Colorado	33	New York	474
Connecticut	74	North Carolina	25
Delaware	12	North Dakota	12
District of Columbia	1,026	Ohio	110
Florida	114	Oklahoma	17
Georgia	60	Oregon	12
Idaho	10	Pennsylvania	470
Illinois	135	Rhode Island	27
Indiana	66	South Carolina	45
Iowa	48	South Dakota	10
Kansas	39	Tennessee	34
Kentucky	53	Texas	70
Louisiana	44	Utah	17
Maine	31	Vermont	10
Maryland	2,153	Virginia	250
Massachusetts	156	Washington	12
Michigan	29	West Virginia	62
Minnesota	52	Wisconsin	4
Missouri	36	Wyoming	5
Montana	67	Alaska	21
Nebraska	19	Hawaii	17
Nevada	37	Puerto Rico	

FOREIGN COUNTRIES

Argentina	1	Hong Kong	1
Australia	2	Ireland	1
Bahamas	2	India	3
Bermuda	1	Indonesia	2
Bolivia	1	Iran	2
Brazil	5	Italy	1
Brunei	1	Japan	1
Canada	2	Kenya	1
Costa Rica	2	Lebanon	1
Cuba	6	Libya	2
Czechoslovakia	2	Madagascar	1
Dominican Republic	1	Malawi	1
Ecuador	2	Malaysia	1
El Salvador	1	Nicaragua	1
England	1	Norway	1
France	2	Peru	1
Germany	3	Philippines	1
Ghana	1	Pakistan	1
Greece	1	Panama	1
Haiti	1	Paraguay	1

Summary of Registration

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Belgium	1	Thailand	4
Brazil	2	Turkey	1
South Africa, Union of	1	United States	3
Sweden	1	Vietnam	1
Switzerland	1		
Sri Lanka	2		

ALUMNI AND ALLIED ASSOCIATIONS

THE GENERAL ALUMNI ASSOCIATION

The objects of this Association are to unite the graduates in closer sympathy and to promote the general welfare of the University. The following persons are eligible for *active* membership: graduates of any college, school, or division of the University; holders of honorary degrees from the University; and members of the Board of Trustees and of the Faculty of the University. Any person who has matriculated, who has been in regular attendance for one year, and who has left the University in good standing, is eligible for *associate* membership.

The Alumni Office is situated at 2018 I Street, Washington, D. C. Alumni are urged to keep the office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

1955-56

Governing Board:

President.—James Robert Kirkland, A.B. 1927, LL.B. 1928, LL.M. 1929 (B.C.S. 1931, Benjamin Franklin University); 5226 Loughboro Road NW., Washington, D. C.

Life Presidents:

Columbian College.—Henry F. Hubbard, A.B. 1928, A.M. 1929, Ph.D. 1934; 6318 32d Street NW., Washington, D. C.

Graduate Council.—Joseph Hyram Roe, Ph.D. 1923 (A.B. 1910, Roanoke College; A.M. 1917, Princeton University; Ph.D. 1934, Yale University); 1352 Jefferson Street NW., Washington, D. C.

School of Medicine.—Luther Henry Snyder, M.D. 1935; 3040 Everett Street NW., Washington, D. C.

Law School.—Justin Lincoln Edgerton, A.B. 1929, LL.B. 1931; 4701 Broad Brook Drive, Bethesda, Md.

School of Engineering.—Merwyn Newell McKnight, Sr., B.S. in M.E. 1938, B.E.E. 1941; 1704 Calvert Street, Arlington, Va.

School of Pharmacy.—F. Royce Franzoni, B.S. in Phar. 1930; 3508 N. Abingdon Street, Arlington, Va.

School of Education.—Elsie Green, A.B. 1914, A.M. 1928; 3151 Tennyson Street NW., Washington, D. C.

School of Government.—Otto Schenckelder, A.B. in Govt. 1933, LL.B. 1942; Tax Court of the United States, Washington, D. C.

Treasurer.—Anna Marie Bischoff, A.B. 1928; 2025 I Street NW., Washington, D. C.

Executive Secretary.—Mary Dow, A.B. 1953; 4734 N. 20th Street, Arlington, Va.

Executive Committee:

Alfred Emanuel Brigulio, M.D. 1930; 2025 I Street NW, Washington, D. C.

Appointed Members:

Harry Cornelius Connor, B.S. in M.E. 1937; 4291 Sheridan Street, Hyattsville, Md.

Lemuel Jackson Embrey, A.B. 1937, LL.B. 1940, LL.M. 1942; 647 22d Street S., Arlington, Va.

Mildred Sandison Finner, A.M. in F.L. 1938, Ed.D. 1944; 408 Lincoln Avenue, Takoma Park, Md.

Morris Gersel Goldstein, Ph.D. 1915; 2704 Woodley Place NW, Washington, D. C.

Walter James Greenleaf, Ph.D. 1922 (A.B. 1912, Bowdoin College, A.M. 1918, Princeton University); 3140 Newark Street NW, Washington, D. C.

George Washington Irving, Jr., B.S. 1918, A.M. 1915, Ph.D. 1929; 4836 Langdrum Lane, Chevy Chase, Md.

Burnice Herman Jarman, A.M. 1932, Ed.D. 1938; 1802 N. Danville Street, Arlington, Va.

Reuben Francis Leatherwood, B.S. in C.E. 1933; 105 Gratton Street, Chevy Chase, Md.

Robert Eugene Newby, ex. 1926; 2706 East West Highway, Chevy Chase, Md.

Charles Jules Rose, A.B. 1942; LL.B. 1949; Investment Building, Washington, D. C.

William Van Amberg Simmons, LL.B. 1925, A.B. 1926; Liberty National Bank, Washington, D. C.

Hilroy Alfred Tolson, A.B. 1924, A.M. 1927 (LL.B. 1930, LL.M. 1931, M.P.L. 1931, National University School of Law); 5200 Sangamore Road, Washington, D. C.

James Cornelius Van Story, Jr., A.B. 1948, A.M. 1949; Wyatt Building, Washington, D. C.

THE GEORGE WASHINGTON UNIVERSITY MEDICAL SOCIETY

The George Washington University Medical Society, the organization of graduates of the School of Medicine, was established in 1905 and since 1926 has been affiliated with the General Alumni Association. The objects of the Society, as stated in the constitution, are "The promotion of the science and art of medicine and the welfare of the School of Medicine."

1955-56

President.—Robert Rice Montgomery, M.D. 1945: (A.B. 1945, Lafayette College); 1746 K Street NW., Washington, D. C.

President Elect.—Richard Henry Fischer, B.S. 1939, M.D. 1943; 1801 I Street NW., Washington, D. C.

First Vice President.—Donald Harper Leeper, Jr., M.D. 1938 (B.S. 1932, Davidson College); 1801 I Street NW., Washington, D. C.

Treasurer.—Naomi Marilyn Kanof, A.B. 1931, M.D. 1934; 1150 Connecticut Avenue NW., Washington, D. C.

Secretary.—William Otis Bailey, Jr., M.D. 1940; 2015 R Street NW., Washington, D. C.

Council

John Hugh Lyons, M.D. 1918, B.S. 1919 (M.S. 1923, University of Minnesota); 1150 Connecticut Avenue NW., Washington, D. C.

Henry John Russell McNitt, B.S. in Med., M.D. 1925; 1835 I Street, Washington, D. C.

Luther Henry Snyder, M.D. 1935 (A.B. 1931, Gettysburg College); 915 10th Street NW., Washington, D. C.

Leland Ernest Stevenson, M.D. 1934; 1219 16th Street NW., Washington, D. C.

THE GEORGE WASHINGTON LAW ASSOCIATION

The George Washington Law Association, the organization of graduates of the Law School, was founded in 1912 and has been affiliated with the General Alumni Association since 1926. Its purposes as stated in the constitution are to promote high standards of legal education, to keep the alumni of the Law School in closer touch with one another and especially with members of their own classes, to gather and publish at intervals information as to the whereabouts and activities of these alumni, and to further the interests of the Law School.

1954-55

President.—Weston Vernon, Jr., LL.B. 1929 (B.S. 1925, Utah State Agricultural College); 715 Broad Street, New York, N. Y.

First Vice President.—John Elmer McClure, LL.B. 1924, LL.M. 1925; Washington Building, Washington, D. C.

Second Vice President.—Joseph D. Hughes, LL.B. 1934 (B.S. 1930, Alabama Polytechnic Institute; LL.M. 1935, Georgetown University); 325 William Penn Place, Pittsburgh, Pa.

Third Vice President.—Justin Lincoln Edgerton, A.B. 1929, LL.B. 1931; Washington Building, Washington, D. C.

Secretary-Treasurer.—Elizabeth Strachan Freret, LL.B. 1950 (B.B.A. 1942, Tulane University); World Center Building, Washington, D. C.

Executive Committee:

Charles Oscar Berry, LL.B. 1932, A.B. 1933; 1100 H Street NW., Washington, D. C.

W. Cameron Burton, LL.B. 1921; Investment Building, Washington, D. C.

Samuel Craighead Caldwell, LL.B. 1943; Wyatt Building, Washington, D. C.

Jonathan C. Gibson, LL.B. 1923; 80 Railway Exchange Building, Chicago, Ill.

Howard Cecil Kilpatrick, LL.B. 1922; American Security Building, Washington, D. C.

Philbrick McCoy, LL.B. 1922, LL.M. 1923; The Superior Court, Los Angeles 12, Calif.

Charles Sylvanus Rhyne, LL.B. 1937; 730 Jackson Place NW., Washington, D. C.

Edward Lipphardt Scheufler, A.B. 1922, LL.B. 1924; 1503 Commerce Building, Kansas City, Mo.

Ex-Officio Member.—Vernon Romney, LL.B. 1922; 212-214 Kearns Building, Salt Lake City, Utah.

THE LIBRARY SCIENCE ALUMNI ASSOCIATION

The Library Science Alumni Association was organized in 1932 by graduates of the Division of Library Science and became an affiliate of the General Alumni Association in 1935. It was established to foster a closer relationship between the Faculty and graduates and to further the interests of the Division of Library Science and of the University as a whole.

1955-56

President.—Mildred Benton, A.B. in L.S. 1934; Naval Research Laboratory, Washington, D. C.

Vice President.—Helene Gingras, A.B. in L.S. 1932; Naval Observatory, Washington, D. C.

Secretary.—Virginia Wise Breen, A.B. in L.S. 1929, A.M. in L.S. 1932; 5603 14th Street NW., Washington, D. C.

Treasurer.—Natalie Hopper, A.B. in L.S. 1942; National Bureau of Standards, Washington, D. C.

THE ENGINEER ALUMNI ASSOCIATION OF THE GEORGE WASHINGTON UNIVERSITY

The Engineer Alumni Association was organized in 1936 and has been affiliated with the General Alumni Association since that time. Its objects are to unite the graduates and Faculty of the School of Engineering in closer fellowship, to promote the general welfare of the School of Engineering and of the University at large, to foster activities of the engineering organizations recognized by the University, and to advance the profession of engineering in general.

1935-36

President.—Warren Clifford Crump, B.C.E. 1930; 4837 16th Street N.E., Washington, D. C.

Vice President.—Robert Park Lathrop, B.M.E. 1942; 4702 47th Street, Chevy Chase, Md.

Secretary-Treasurer.—John Paul Conner, B.E.E. 1930; 8204 Nolte Street, Silver Spring, Md.

Corresponding Secretary.—Wallace Grover Kistler, Jr., B.M.E. 1949; 741 S. Florida Street, Arlington, Va.

Executive Committee:

Reuben Francis Leatherwood, B.S. in C.E. 1933; 106 Grafton Street, Chevy Chase, Md.

Milton Parkins Birthright, B.S. in C.E. 1934; 8712 Colesville Road, Silver Spring, Md.

Merwyn Newell McKnight, Sr., B.S. in M.E. 1938, B.E.E. 1941; 1704 N. Calvert Street, Arlington, Va.

THE GEORGE WASHINGTON UNIVERSITY NURSES ASSOCIATION

The George Washington University Nurses Association was organized in 1914. In 1930 this organization was made an integral part of the General Alumni Association, and graduates of the School of Nursing were granted associate membership. The objects of the Association are to hold in union the graduates of the George Washington University Hospital School for Nurses, to care for its sick members, and to promote the advance of nursing in the interest of the George Washington University Hospital.

1955-56

President.—Flora Schroebel, N. Dip. 1929; 4730 16th Road N., Arlington, Va.

Vice President.—Pauline Tarpley, N. Cert. 1931; 1228 I Street N.W., Washington, D. C.

Secretary.—Ruth Poindexter, N. Dip. 1924; 1815 17th Street NW., Washington, D. C.

Treasurer.—Alma W. Stevens, N. Dip. 1928; 4106 Madison Street, Hyattsville, Md.

REGIONAL ALUMNI CLUBS

Regional alumni clubs sponsored by the General Alumni Association are maintained in the following places: Los Angeles, Calif.; Denver, Colo.; Miami, Fla.; Atlanta, Ga.; Chicago, Ill.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; Kansas City, Mo.; Brooklyn, N. Y.; New York City, N. Y.; Cleveland, Ohio; Tulsa, Okla.; Portland, Oreg.; Philadelphia, Pa.; Pittsburgh, Pa.; Dallas, Texas; Norfolk, Va.; Seattle, Wash.; Milwaukee, Wis.; Arkansas, Northern California; New Jersey; Ohio River Valley; Utah; Hawaii; Philippine Islands; Puerto Rico.

Information about the officers and activities of these clubs may be obtained from the Alumni Office of the University.

THE GRADUATE ENDOWMENT FUND

The Graduate Endowment Fund was founded by the class of 1926 with the object of providing endowment to be used for the development of the University. Membership is limited to seniors and graduates who sign a pledge of \$100, payable annually in ten equal installments.

The pledge notes and funds are held in trust. When the principal reaches the sum of \$100,000, the Board of Administrators of the Fund may pay the University such sums as it may vote for the erection of buildings, acquisition of sites, maintenance, and purchase of equipment. At no time may money be drawn so as to leave a balance of less than \$50,000 on deposit.

On request, the Alumni Office of the University will furnish pledge blanks to alumni.

THE COLUMBIAN WOMEN

The objects of this organization are (1) the promotion of acquaintanceship among its members, (2) the advancement of women by the founding of scholarships in the various departments of the University; and (3) the promotion of the interests of the University.

MEMBERSHIP

The following persons shall be eligible for active membership: (a) any woman who for one year has been a regularly registered student in The George Washington University, provided that she shall have

received credit for thirty hours of work; (b) any woman member of the Faculties or Board of Trustees, any woman on the administrative staff; the wife of any member of the Faculties, Board of Trustees, or of the administrative staff; (c) any woman recipient of an honorary degree from the University.

1955-56

President.—Mary Magdalen Connelly, LL.B. 1922; 1830 17th Street NW., Washington, D. C.

First Vice President.—Virginia Randolph Kirkbride (B.S. 1941, A.M. 1942, University of Nebraska); 2129 G Street NW., Washington, D. C.

Second Vice President.—Juanita M. Winn, A.B. in Ed. 1933, A.M. 1936; 706 E Street SE., Washington, D. C.

Treasurer and Corresponding Secretary.—Josephine Stambaugh; 200 Great Falls Street, Falls Church, Va.

Assistant Treasurer.—Anna Marie Bischoff, A.B. 1928; 2025 I Street NW., Washington, D. C.

Recording Secretary.—Edith Elizabeth Harper, A.B. in Ed. 1950; 3027 Oliver Street NW., Washington, D. C.

Historian.—Hazel Smallwood Hanback, A.B. 1940; 2152 F Street NW., Washington, D. C.

THE WOMEN'S BOARD OF THE GEORGE WASHINGTON UNIVERSITY HOSPITAL

The object of this organization is to aid in every way the interests and advancement of the George Washington University Hospital. Meetings are held on the first Wednesday of each month, October to June, inclusive. Inquiries regarding membership should be addressed to the Corresponding Secretary, The George Washington University, Washington 6, D. C.

1955-56

President.—Mrs. Cloyd Heck Marvin

Vice President.—Mrs. Wilbur Carr

Vice President.—Mrs. Walter A. Bloedorn

Vice President.—Miss Grace Burton

Recording Secretary.—Mrs. Charles Naeser

Corresponding Secretary.—Mrs. Rufus Roll

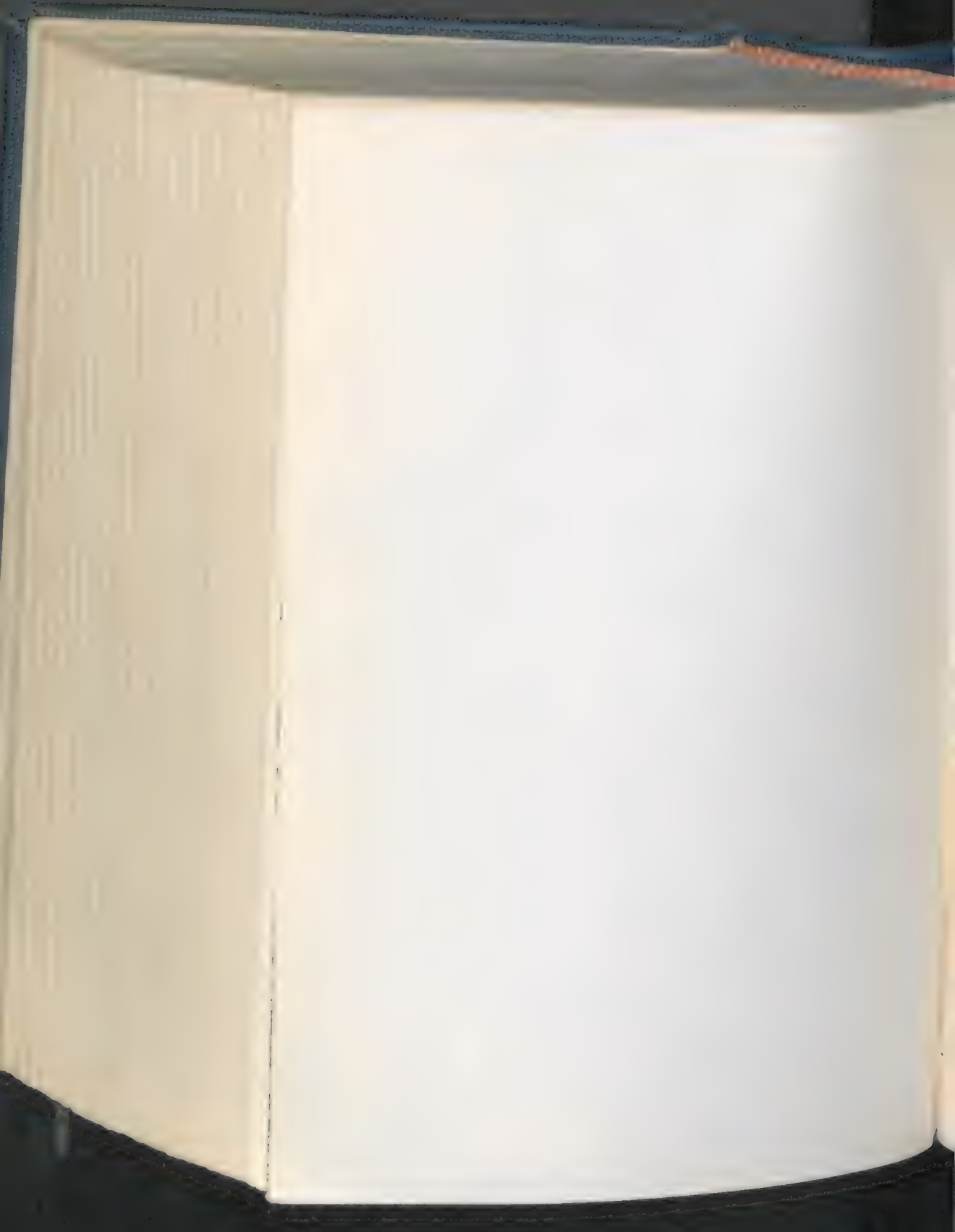
Assistant Corresponding Secretary.—Mrs. William McKelway

Treasurer.—Miss Florence W. Moyer

Assistant Treasurer.—Mrs. Barton Winters Richwine



The George Washington University Hospital and Observation Department



THE
GEORGE
WASHINGTON
UNIVERSITY

BULLETIN

VOL. LIII

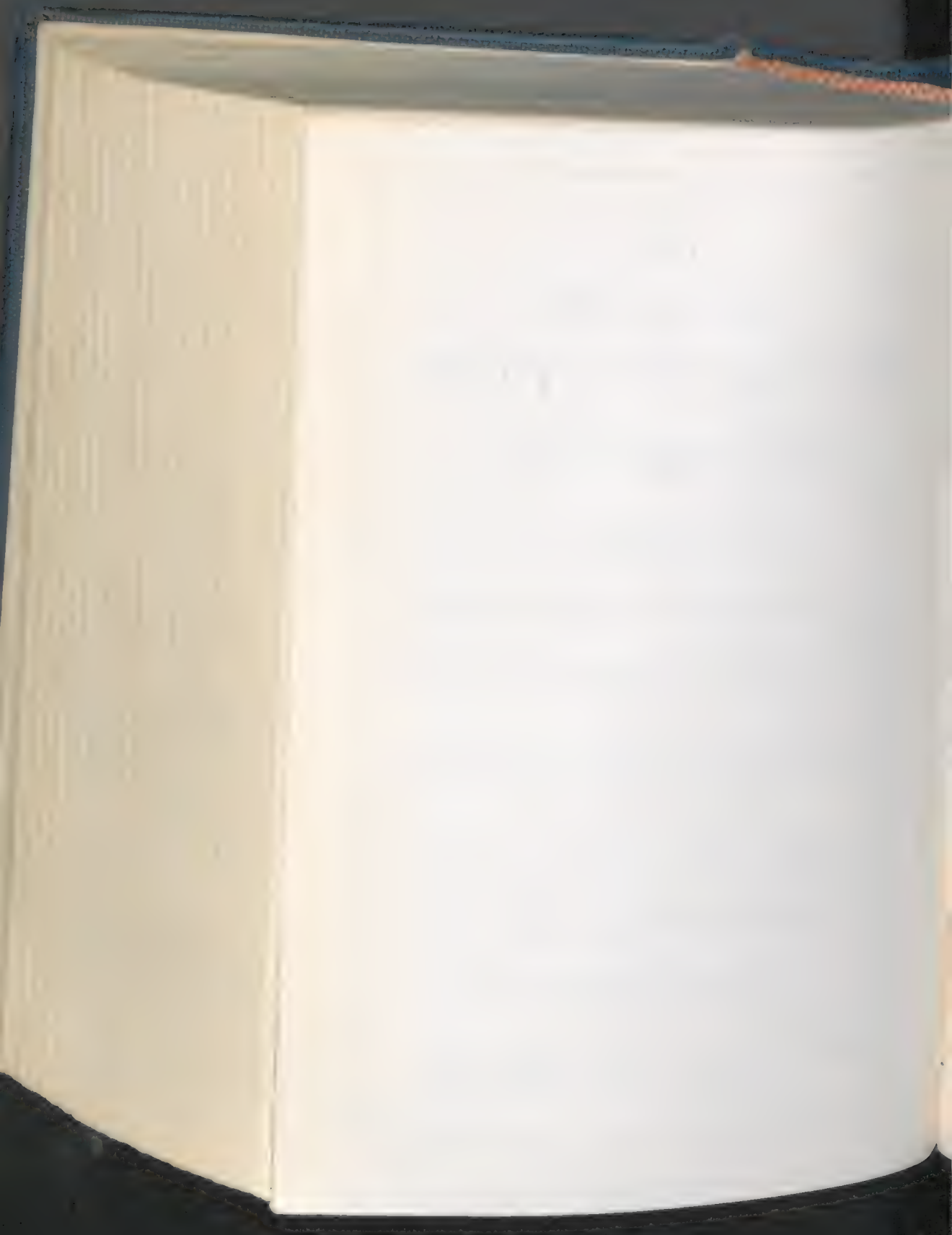
No. 7

THE SCHOOL OF MEDICINE

WASHINGTON, D. C.

PUBLISHED IN SEPTEMBER
MCMLIV

BY THE UNIVERSITY



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CALENDAR OF THE SCHOOL OF MEDICINE 1955-56

Date	Day	Observance
1955		
Sept. 13	Tuesday	Registration for second, third and fourth year students
Sept. 15	Thursday	Registration for the academic year 1955-56
Sept. 19	Monday	Academic year begins
Nov. 4	Friday	Fall Convocation. Holiday
Nov. 24-26	Thursday through Saturday	Thanksgiving recess
Dec. 19-31	Monday through Saturday	Christmas recess
1956		
Jan. 2	Monday	Classes resume
Jan. 21	Saturday	Last day of classes for the fall term
Jan. 23-28	Monday through Saturday	Fall term examination period
Jan. 30	Monday	Classes resume for the spring term
Feb. 22	Wednesday	Winter Convocation. Holiday
March 30 and 31	Friday and Saturday	Winter recess
May 21-26	Monday through Tuesday	Spring term examination period
June 3	Sunday	Recess
June 6	Wednesday	Commencement

THE BOARD OF TRUSTEES

The Board of Trustees of the University is composed of the President of the University ex officio and the following persons by election:

Robert Vedder Fleming, LL.D., *Chairman*
Newell Windom Ellison, A.B., LL.B., Sc.D., *Secretary*

Clarence Aiken Aspinwall
Lyman James Briggs, Ph.D., Sc.D., D.Eng., LL.D.
John St. Clair Brookes, Jr., A.M., LL.B.
Mrs. Wilbur John Carr
Homer Cummings, Ph.B., LL.B., LL.D., LL.H.D.
*Watson Davis, B.S. in C.E., C.E.
Mrs. Joshua Evans, Jr., A.B., LL.D.
*Robert Elliott Freer, A.B., LL.M.
Charles Carroll Glover, Jr., A.M., LL.B., LL.D.
Ulysses S. Grant, 3d, B.S., Graduate United States Engineers School
Gilbert Grosvenor, A.M., LL.D., LL.H.D., Sc.D.
*Brooks Hays, A.B., LL.B., LL.D.
John Edgar Hoover, LL.M., LL.D.
Frank Atherton Howard, B.S. in M.E., LL.B.
Evan Howell, B.S., LL.B.
Robert Houghwout Jackson, LL.B., LL.D.
Alfred Henry Lawson, LL.B.
John Keown McKee
Benjamin Mosby McKelway
*James Matlack Mitchell, A.M.
*Miss Helen Newman, LL.M.
Donald D'Arcy Shepard, LL.B.
Charles Hook Tompkins, D.Eng.
Walter Rupert Tuckerman, A.B., LL.B., LL.D.
James Edwin Webb, A.B.
Alexander Wetmore, Ph.D., Sc.D.
*Charles Stanley White, M.D., Sc.D.
Lloyd Bennett Wilson

* Nominated by the alumni.

OFFICERS OF ADMINISTRATION

THE UNIVERSITY

Cloyd Heck Marvin, Ph.D., LL.D., *President of the University*
Oswald Symister Colclough, B.S., LL.B., LL.D., *Dean of Faculties*
Myrna Pauline Sedgwick, A.B., *Administrative Secretary*
Henry William Herzog, B.S., *Treasurer*
Cland Max Farrington, A.M., *Assistant to the President*
Harold Griffith Sutton, M.S., *Director of Admissions*
Fred Everett Nessell, A.B., *Registrar; Secretary of the Faculties*
John Russell Mason, B.S. in L.S., A.M., *Librarian; Curator of Art*
Virginia Randolph Kirkbride, A.M., *Director of Activities for Women*
Don Carlos Faith, A.M., *Director of Activities for Men; Director of
Veterans Education*
Alan Thomas Deibert, A.M., *Adviser to Students from Foreign Countries*
Dunel LeRay Borden, A.M., M.D., *Director of Health Administration*
Benjamin Douglass Van Evera, Ph.D., *Coordinator of Scientific Activities*

THE SCHOOL OF MEDICINE AND THE UNIVERSITY HOSPITAL

Walter Andrew Bloedorn, A.M., M.D., Sc.D., *Dean of the School of
Medicine; Medical Director of the University Hospital*
Thomas Martin Peery, A.B., M.D., *Director of Postgraduate Instruc-
tion*
Victor Frederick Ludewig, A.B., B.S., *Superintendent of the University
Hospital*

FACULTY AND STAFF OF INSTRUCTION IN MEDICINE

EMERITUS FACULTY

DANIEL LERAY BORDEN, A.M., M.D.
Professor Emeritus of Clinical Surgery

PAUL FREDERICK DICKENS, M.D.
Professor Emeritus of Clinical Medicine

GEORGE BAIN JENKINS, M.D.
Professor Emeritus of Anatomy

WILLIAM JOHNSTON MALLORY, A.M., M.D.
Professor Emeritus of Medicine

JAMES FARNANDIS MITCHELL, A.B., M.D.
Professor Emeritus of Clinical Surgery

GEORGE BYRON ROTH, A.B., M.D.
Professor Emeritus of Pharmacology

ACTIVE FACULTY AND STAFF OF INSTRUCTION*

THEODORE HUDSON ABERNETHY, B.S., M.D.
Assistant Clinical Professor of Medicine, Associate in Medicine, University Hospital

JOHN PLETCH ADAMS, B.S., M.D.
Assistant Clinical Professor of Orthopedic Surgery, Chief of Service in Orthopedic Surgery, University Hospital, Chief, George Washington University Orthopedic Surgery Division, D. C. General Hospital

PAUL CHARLES ADKINS, A.B., M.D.
Instructor in Surgery, Associate in Surgery, University and D. C. General hospitals

SAMUEL JACOB AHI, Ph.D.
Special Lecturer in Microbiological Chemistry

SALOMON NAPIITALI ALBERT, A.B., M.D., D.A.
Clinical Instructor in Anesthesiology, Associate in Anesthesiology, University and D. C. General hospitals

ERRETT CYRIL ALBRITTON, A.B., M.D.
Fry Professor of Pharmacology

FRANK DEANE ALLAN, Ph.D.
Assistant Professor of Anatomy

*The Staff of Instruction listed here and at the head of each department is for the academic year 1954-55.

MELVIN GUSTAVUS ALPER, A.B., M.D.

Clinical Instructor in Ophthalmology, Associate in Ophthalmology, University Hospital

LOUIS KATZ ALPERT, B.S., M.D.

Clinical Professor of Medicine, Associate in Medicine, University and D. C. General hospitals

SEYMOUR R. ALPERT, A.B., M.D.

Associate Professor of Anesthesiology, Associate in Anesthesiology, University and D. C. General hospitals

JAMES FRANCIS AMBURY, B.S., M.D.

Clinical Instructor in Medicine, Associate in Medicine, University Hospital

HARVEY AMMERMAN, B.S., M.D.

Clinical Instructor in Neurological Surgery, Associate in Neurological Surgery, University and D. C. General hospitals

HARRY FORD ANDERSON, M.D.

Professor of Dermatology and Syphilology, Chief of Service in Dermatology and Syphilology, University Hospital

ROBERT HARPER ANDERSON, M.D.

Clinical Instructor in Pediatrics, Associate in Pediatrics, University and D. C. General hospitals

WILLIAM STATION ANDERSON, A.B., M.D.

Clinical Professor of Pediatrics, Associate in Pediatrics, University Hospital

HABIB BACCHUS, Ph.D., M.D.

Assistant Research Professor of Physiology

FRANK SOLOMON BACON, B.S., M.D.

Associate in Medicine, Associate in Medicine, University and D. C. General hospitals

ALFRED BAER, A.B., M.D.

Clinical Instructor in Medicine, Associate in Medicine, University Hospital

WILLIAM ELDRIDGE BAGEANT, M.D.

Clinical Instructor in Anesthesiology, Associate in Anesthesiology, University and D. C. General hospitals

WILLIAM OTIS BAILEY, Jr., M.D.

Clinical Instructor in Medicine, Associate in Medicine, University and D. C. General hospitals

ROBERT HENRY BARTER, B.S., M.D.

Assistant Professor of Obstetrics and Gynecology, Associate in Obstetrics and Gynecology, University Hospital; Associate Chief, George Washington University (Obstetrics and Gynecology Division, D. C. General Hospital)

JEANNE CECILE BATTAMAN, A.B., M.D.

Clinical Instructor in Medicine, Associate in Medicine, University Hospital

HARRY CLARK BATES, B.S., M.D.

Clinical Instructor in Medicine, Associate in Medicine, University Hospital

- EMIL HERBERT BAUERSFELD, A.B., M.D.
Clinical Instructor in Medicine Associate in Medicine, University Hospital
- RALPH GREGORY BEACHLEY, M.D., D.K.P.H.
Adjunct Professor of Public Health Practice
- VIRGINIA PATTERSON BEELAR, A.B., M.D.
Clinical Instructor in Medicine Associate in Medicine, University Hospital
- JOSEPH BEINSTEIN, A.B., M.D.
Associate in Medicine, Associate in Medicine, University and D. C. General Hospital
- RUTH BOSCHWITZ BENEDICT, A.B., M.D.
Clinical Instructor in Medicine Associate in Medicine, University and D. C. General Hospital
- CARL BERG, M.D.
Assistant, Clinical Professor of (Orthopedic) Surgery Associate in Orthopedic Surgery, University and D. C. General Hospital
- ROGER BERGSTROM, M.D.
Clinical Instructor in Pediatrics Associate in Pediatrics, University Hospital
- ROBERT WILLIAM BERTLINER, B.S., M.D.
Professor of Lectures in Medicine Associate in Medicine, University Hospital
- SIDNEY BERMAN, B.S., M.D.
Assistant Clinical Professor of Psychiatry Associate in Psychiatry, University Hospital
- SOLOMON ROBINY BERSACK, B.S., M.D.
Assistant Clinical Professor of Radiology Associate in Radiology, University Hospital
- ROLAND ESSIE BILLEN, M.D.
Clinical Instructor in Obstetrics and Gynecology Associate in Obstetrics and Gynecology, University Hospital
- CATHARINE BIRCH, A.B., M.D.
Clinical Instructor in Obstetrics and Gynecology Associate in Obstetrics and Gynecology, University and D. C. General Hospital
- EMILIE ANNABELLE BLACK, B.S., M.D.
Clinical Instructor in Pediatrics Associate in Pediatrics, University Hospital
- BRIAN BLADES, A.B., M.D.
Professor of Surgery, Chief of Service in Surgery, University Hospital, Chief George Washington University Surgery Institute, D. C. General Hospital
- WALTER ANDREW BLOEDORN, A.M., M.D., S.D.
Professor of Medicine, Dean of the School of Medicine, Medical Director, University Hospital
- LESTER SYLVAN BILMENTHAL, A.B., M.D., M.S. in Med.
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 Charles Seymour Coakley, M.D., *Professor of Anesthesiology*
 Ira Rockwood Telford, Ph.D., *Professor of Anatomy*
 Ernest Alfred Watson Sheppard, M.D., C.M., *Clinical Professor of Ophthalmology*
 Radford Brown, M.D., *Clinical Professor of Obstetrics and Gynecology*

* The President of the University, the Dean of Faculties of the University, and the Registrar of the University are members of the Faculty.
 ‡ On leave of absence 1934-35.

Thomas Carlton Thompson, B.S., M.D., *Clinical Professor of Urology*
 William Staton Anderson, A.B., M.D., *Clinical Professor of Pediatrics*
 William Herndon Jenkins, M.D., *Clinical Professor of Otolaryngology*
 *Paul Calabrisi, A.M., *Associate Professor of Anatomy*
 Harold George Mandel, Ph.D., *Associate Professor of Pharmacology*
 Victor Frederick Ludewig, A.B., B.S., *Superintendent of the University Hospital*

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Winifred Overholser
 Brian Blades

Angus MacIvor Griffin

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Ira Rockwood Telford

Victor Frederick Ludewig

* On leave of absence 1954-55.

† The President of the University and the Dean of the School of Medicine are members ex officio of all committees.

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GENERAL INFORMATION

INTRODUCTORY

The School of Medicine of The George Washington University was opened in March 1828, of the medical schools now in existence in the United States, it is the eleventh in chronological order of founding. The University Hospital and Dispensary were established in 1808 and made a part of the organization of the School.

The School is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. The degrees of the School of Medicine are recognized by all state examining boards.

PURPOSE AND AIMS

The purpose of the School of Medicine is to train physicians competent in the art and science of medicine, which includes general practice, further training for special practice, teaching, research, and medical administration.

On the undergraduate level the aims of the school are (1) to select for training students of superior aptitude and character; (2) to train students thoroughly in the theoretical principles and in the laboratory and clinical applications of the medical sciences; and (3) to provide a diversity of clinical experience with a wide range of clinical material, through well supervised clinical clerkships in federal, public, and private hospitals providing facilities for all specialized fields of medicine.

The aims of the School of Medicine in the fields of graduate and postgraduate instruction are (1) to provide interns and residents for a number of hospitals in the Washington area for advanced training in both general and specialized practice; (2) to direct an expanding program of fundamental and applied research, integrated with teaching at the School of Medicine, and in keeping with the increasing need for medical knowledge and the growth of Washington as one of the world's great centers of medical research; and (3) to provide postgraduate instruction in the most recent advances in research and in clinical medicine.

To achieve these objectives the School of Medicine has developed the systematic plan of instruction outlined below and a balanced, comprehensive curriculum. In carrying out its program the School seeks to maintain a faculty of appropriate size and outstanding ability, to make the most effective use of the expanding University facilities, and to take full advantage of the exceptional opportunities for clinical and research training in the Washington area.

ORIENTATION PROGRAM

A distinctive curricular feature of the George Washington University School of Medicine is a program for the orientation of students entering the School which is given to them during the first week of the regular academic year. The aims of the program are: (1) to acquaint the student with the School of Medicine and with the faculty of the School of Medicine; (2) to bridge the gap between premedical and medical education; (3) to indoctrinate the student in the responsibilities and ethical principles upon which medical practice rests; (4) to help the student get an effective start in his medical studies.

The orientation course is given because it is recognized that students find medical school quite different from their previous college experience. The language is different, the techniques are more detailed, and the demands upon the students in quality and quantity of work are far more exacting. It has been found helpful to point out to the students that at times they feel the requirements are too rigorous, they are being trained for decisions which may mean suffering or well-being, life or death, for patients who ultimately will be under their care. The subjects covered in the orientation course include an interpretation of the student outlook by the President of the current senior class, a discussion of the relationship between premedical and medical education, by a member of the Committee on Admissions, a thirty hour course in the evaluation of scientific evidence, the history of the School of Medicine, an explanation of the medical curriculum by the Chairman of the Committee on Curriculum, an introduction to the Medical Library with guidance on how to use it by the Chairman of the Library Committee, a statement of the ideals and aims of the medical profession by the Dean, a brief course in the history of medicine as related to the various preclinical and clinical subjects by heads of departments, a lecture on the relationship of the physician and the law by an eminent medical legal authority, a discussion of medical ethics and the patient-physician relationship, explanation of student health program, a presentation of basic concepts of health and disease by a Professor of Medicine, and practical advice to the students on how to study by a senior member of the faculty.

PLAN OF INSTRUCTION

The curriculum is a graded one beginning with fundamental aspects of the basic sciences and progressing gradually into the clinical teaching of the last two years. The teaching is organized systematically under the various departments of the School of Medicine as listed under Courses of Instruction in this CATALOGUE.

During the first year the student receives instruction in anatomy,

biochemistry, and physiology, using the classroom and laboratory facilities of the School of Medicine. In order to emphasize the importance of the basic sciences, patients are studied from time to time and the relationship of these fundamental sciences to the clinical sciences is stressed.

In the second year, having completed the preliminary study of the structure and function of the normal body, the mechanisms of disease are considered. The various bacteria and other microbiologic agents capable of producing disease are studied in the laboratory. The effects of various diseases upon the tissues of the human body are taught in pathology, serving as a basis for the understanding of disturbed structure and function. The mode of action of the various drugs and therapeutic agents is studied in the course in pharmacology as an introduction to the use of these agents in the treatment of patients. The student is taught to conduct a physical examination and to interpret and evaluate the various symptoms of disease. During the second term of this year patients are assigned to him for case study under the close supervision of his instructors. Introductory lectures in medicine, surgery, pediatrics, obstetrics and gynecology, neurology, radiology, and psychiatry are given during this period, preparing the student for his responsibility with patients in the hospital wards and clinics.

In the third year the student is assigned to the District of Columbia General Hospital for closely supervised clinical instruction. He serves as clinical clerk in the various divisions of the hospital and assists in the preparation of the clinical records and basic laboratory examinations. He learns to perform the common ward procedures and to use diagnostic and therapeutic equipment. During this period there are daily lectures and clinical demonstrations planned in an orderly fashion proceeding from simpler to more complex problems.

During the summer period following the third year the student is required to spend eight weeks in one of the various teaching facilities of the School of Medicine. This plan permits limited electives, so that the student may explore opportunities in the various specialties not ordinarily included in the medical curriculum.

In the fourth year the student spends most of his time in the study of ambulatory patients. This instruction is given in the clinics of the University Hospital, Children's Hospital, Mount Alto Hospital, Walter Reed General Hospital, and St. Elizabeths. In these various institutions members of the faculty continue to supervise the students in their evaluation of clinical problems by a careful review of each patient, and joint planning of treatment procedures. Stress is placed upon the total individual and his environment, since it is recognized that many factors, emotional and economic as well as physical, contribute to disease and must be considered if the individual is to be restored to health and effectiveness. Instruction in the basic sciences is continued

in the fourth year in special conferences in which representatives of several departments of instruction participate.

By the completion of his four year course the student must have demonstrated that he has acquired the basic knowledge and experience necessary for advanced training on the internship.

EQUIPMENT AND FACILITIES

The George Washington University Hospital.—The hospital, with a capacity of 400 beds, was opened in 1948. This splendid edifice, which is one of the outstanding hospitals in the United States, is completely furnished with the latest and most scientific apparatus and equipment. Its purpose is to supplement existing hospital resources in the District of Columbia for the care of the sick and the injured; the education of physicians, nurses, and technicians; and the advancement of medical knowledge.

The hospital is staffed and controlled by the Faculty of the George Washington University School of Medicine and it provides excellent clinical material for the instruction of medical students. Virtually every specialty in the fields of medicine and surgery has assigned space and equipment in both the outpatient department and the bed-patient section of this modern institution.

Medical School Building.—The building housing the School of Medicine is a five-story structure with lecture rooms, classrooms, students rooms, and the following laboratories: anatomy; bacteriology; hygiene and preventive medicine; biochemistry; pathology; and pharmacology and physiology.

They are fully equipped to enable students to pursue adequately the laboratory courses and to acquire the technical skill necessary in modern clinical and investigative work.

Research Building.—The Research Building houses special laboratories for graduate and staff research in the Departments of Anatomy, Biochemistry, Pharmacology, Physiology, and Bacteriology, Hygiene and Preventive Medicine. Special facilities are provided for the study of radio-active compounds, for tissue-culture techniques, and for virological procedures. Selected students are invited to participate in certain aspects of the research program either on a volunteer basis or with the support of special Research Scholarships.

The first floor of the building houses the Medical Library as well as photographic laboratories and other facilities for audio-visual aids to education.

Medical Library.—The Medical Library contains a selected reference collection of more than 10,000 volumes, currently obtains important new medical works, and regularly receives the principal medical journals.

Inter-library loan service is maintained by close cooperation with other medical and scientific libraries throughout Washington and vicinity.

The Medical Library is open from 9:00 A.M. to 9:00 P.M. each class day, Monday through Friday, and from 9:00 A.M. to 1:00 P.M. Saturday.

The Medical Library maintains a branch in Room 60137-A of the University Hospital for reference, research, and inter library loan service. It is open from 2:00 to 6:00 P.M. Monday through Friday.

GOVERNMENT LIBRARIES AND MUSEUMS

The Armed Forces Institute of Pathology, on the grounds of Walter Reed Army Medical Center, affords unexcelled opportunity for study of conditions met in general medicine and surgery as well as those of peculiarly military significance. Its collection of anatomical and pathological specimens comprises material received from all areas of the world and is unequalled in this country. The Museum of Hygiene, the National Museum, the Smithsonian Institution, the Botanic Gardens, and the various collections of the Department of Agriculture all afford opportunity for study of materials of special interest in various areas of Medicine and its allied sciences.

CLINICS

Students at the George Washington University School of Medicine receive clinical training at the University Hospital, at the new University Cancer Clinic, and at five affiliated hospitals. In the very first year the medical student begins his work in the hospital as well as in the lecture halls and classrooms.

The University Hospital.—All clinics are under the supervision of the Dean, who is also Medical Director of the Hospital. This insures the highest possible utilization of available clinical material for teaching purposes and the proper supervision of clinicians and students, it brings the individual student into direct contact with patients and requires him to do, under authoritative supervision, the clinical and laboratory work necessary for diagnosis and treatment, and it permits proper interpretation of the conditions occurring during the progress of cases and promotes the keeping of adequate records. Clinical and clinicopathological conferences are held in which the history of cases, the physical findings, laboratory records, and the post-mortem pathology when available are presented and correlated.

The Outpatient Department.—The Outpatient Department has clinical facilities for each Service in the Hospital. Fourth year students are assigned in rotation by section for clinical instruction in the Outpatient Department.

The George Washington University Cancer Clinic.—This modern building, opened in 1954, houses the Cancer Detection Clinic; the Helen L. and Mary E. Warwick Memorial; and special laboratories for research related to the nature, diagnosis, and treatment of cancer.

The facilities of the Cancer Detection Clinic are available to medical students. In addition the diagnosis and treatment of various forms of neoplasms are presented. The results of the treatment of neoplasms are evaluated by follow-up studies.

The Helen L. and Mary E. Warwick Memorial, for cancer and allied diseases, was affiliated with The George Washington University in July 1948. The purposes of this clinic are (1) to provide care for cancer patients, through group consultations within a cancer organization, and (2) to provide training for students and physicians in the field of oncology.

The District of Columbia General Hospital, Washington's large city hospital, has 1,420 beds, an outpatient department in which 76,900 patient visits are made each year. It provides clinical opportunities in virtually every branch of medicine and surgery.

Medical students receive clinical training in certain fields at the Walter Reed Army Hospital, one of the Armed Forces' outstanding teaching hospitals. Clinical experience in both medical and surgical subjects is also provided at the Mt. Alto Veterans Administration Hospital.

At Children's Hospital, one of the largest and best known hospitals for children in the United States, medical students receive training and clinical experience in Pediatrics, with both clinic and in-patient patients.

St. Elizabeths Hospital, which has recently celebrated the 100th anniversary of its founding, is one of the world's most famous mental hospitals. This hospital cares for 7,500 patients with virtually every known psychiatric and neurologic disorder. The George Washington University medical students begin their studies in psychiatry in their first year and these studies continue throughout the four years. Much of their clinical instruction in psychiatry and neurology is received at St. Elizabeths, and prominent psychiatrists and neurologists on the St. Elizabeths staff are members of the George Washington University School in Medicine faculty. Additional clinical experience in psychiatry and neurology is gained by students at the George Washington University Hospital Psychiatric Department, in the Outpatient Department of the University Hospital, and special lectures and clinical work in child psychiatry are given in the Psychiatric Department of Children's Hospital.

ADMISSION

Ninety hours of credit applicable toward a degree in this University or another college of liberal arts and sciences are required for admission to the School of Medicine.

A credit hour represents one class hour or a minimum of two laboratory hours a week for a period of one term of approximately sixteen weeks.

PREMEDICAL COLLEGE REQUIREMENTS

Ninety Credit Hours

1. Chemistry, sixteen credit hours as follows: (a) eight credit hours in general inorganic chemistry, of which at least four credit hours are laboratory work (qualitative analysis may be counted as general inorganic chemistry); (b) eight credit hours or a one-year college course of organic chemistry, including laboratory work.
2. Physics, eight credit hours, of which at least two credit hours are laboratory work. It is recommended that this course be preceded by one in trigonometry.
3. Biology, eight credit hours, of which at least four credit hours are laboratory work. This requirement may be satisfied by a course of eight credit hours in either general biology or zoology.
4. English composition and literature, six credit hours: the usual introductory college course or the equivalent. The student should develop facility in speaking and writing English.
5. Modern foreign language: a reading knowledge, preferably of French or German.
6. Electives. It is recommended that the remaining credit hours required include: comparative vertebrate anatomy, botany, and vertebrate embryology, qualitative and quantitative chemical analysis, social science and psychology.

ADVANCED STANDING

A student who has satisfactorily completed one or two years at any other medical school approved by the American Medical Association, and who has the necessary preliminary educational requirements, may apply for advanced standing.

APPLICATION FOR ADMISSION

1. Full directions for application will be furnished on request. The applicant should ask the registrar of each college previously attended

to send an official transcript of record to the Director of Admissions, The George Washington University. Photostatic copies of credentials without the original signature of the certifying authority are not satisfactory. It is the responsibility of the applicant to see that all credentials are forwarded to the Admissions Office of the University.

2. Two recent photographs, with signatures, are required of each applicant.

3. As the number of qualified applicants for admission to the School each year far exceeds its capacity, the candidate for admission should secure from the colleges attended completely compiled premedical credentials and send them for evaluation well in advance of the term to which he is applying.

4. Applicants for admission are urged to take the Medical College Aptitude Test of the Association of American Medical Colleges.

5. A fee of \$8 to defray the costs of completing the records for final consideration for admission must accompany each application.

REGISTRATION

For the academic year 1955-56, registration will be conducted at the Medical School, 1335 H Street NW, from 10:00 A.M. to 4:00 P.M., September 15. Registration is for a period of one academic year.

FEES AND FINANCIAL REGULATIONS

The following fees have been adopted:

Tuition fee, for each academic year.

Fee for special examinations, for each subject.

Graduation fee.

\$80.00

2.00

PAYMENT OF FEES

Fees for each term are \$425, payable in advance.

All fees are payable at the Office of the Cashier at the University, 725 Twenty-first Street NW. Fees due must be paid at the time of registration; no student is permitted to complete registration or to attend classes until fees are paid.

Registration in the School of Medicine is for a period of one academic year. After the student has entered the courses of instruction he is obligated for the full tuition for the academic year. No part of the tuition will be refunded upon withdrawal or dismissal for any cause. Acceptance by the School of a student's fees does not in any way obligate the School to accept the student for any subsequent year, and the right is reserved to drop any student from the School whenever, in the interest of the student or the School, the Faculty deems it advisable to do so.

Because the number of applicants far exceeds the limit of each class, places can be reserved only for those qualified applicants who remit a deposit of \$100 which will be credited toward the tuition of the first term. Under no circumstances will this deposit be refunded.

Credit for work will not be given until, at the completion of a laboratory course, the student has replaced or paid for all articles of equipment or other University property which he has lost, broken, or destroyed. All breakage or loss not directly traceable to an individual student is assessed pro rata.

COST OF TEXTBOOKS AND STUDENT EQUIPMENT

The minimum cost of necessary textbooks and student equipment (microscope, drawing materials, glass slides, clinical thermometer, stethoscope, hemocytometer, uniforms, etc.) is approximately as follows: first year, \$400; second year, \$250; third year, \$125; fourth year, \$80; total \$855.

A fee of \$1 a term is charged for the use (optional) of a locker.

FELLOWSHIPS

The following fellowships are available to graduate students. Applications should be submitted for consideration not later than April 1 preceding the period for which the fellowship is to be awarded.

The applicant for a University Teaching Fellowship or a Special Fellowship is expected to be a prospective candidate for the degree of Doctor of Philosophy, and to have his Master of Arts degree, or the equivalent, in the general field of his future doctoral study and research. Forms on which to make application for these fellowships may be obtained from the Chairman of the Graduate Council.

University Teaching Fellowships.—These are assigned for the academic year in the following departments of instruction: Bacteriology, Biochemistry, Botany, Chemistry, Economics, English, History, Physics, Psychology, Romance Languages and Literatures, and Statistics. Each fellow receives an annual stipend, plus full tuition in the Graduate Council, for whatever schedule of study or research his fellowship duties permit him to carry. The occupant of each of these fellowships renders a designated unit of service to the department of instruction in his major field of doctoral study, usually in classroom or laboratory assignments.

Special Fellowships.—Special fellowships are supported by endowment, and are awarded to doctoral students of unusual promise and ability. The stipend is not fixed but varies in amount with the need of the individual receiving the award. In applying for one of these fellowships

it is advantageous that the student appear personally for an interview with the Chairman and such other members of the Graduate Council as would be interested in the research investigations proposed. These fellowships include the Thomas Bradford Sanders Fellowships.

SCHOLARSHIPS AND PRIZES

Scholarships are awarded for two terms unless otherwise specified and are credited in equal parts for each term. Each holder must carry a full schedule of academic work during the period for which the scholarship is awarded. Applicants (except in the case of the Daughters of the American Revolution Scholarship and the Eugene and Agnes E. Meyer scholarships) must have established an academic record in courses at this institution, and should apply on prescribed forms which must be filed in the Office of the Chairman of the Committee on Scholarships not later than April 1 preceding the academic year for which the scholarship is to be awarded. Further information concerning the following scholarships may be obtained from the Chairman of the Committee on Scholarships.

Anna Bartsch Scholarship.—This scholarship, in the amount of \$500, established in 1946 by Dr. Anna Bartsch Daune, as a memorial to her mother, Anna Bartsch, is available to a woman in the School of Medicine, "of outstanding scholarship, character, and promise, who intends to make the practice of medicine her life profession". The award is made upon the recommendation of the Faculty of the School of Medicine. For the year 1954-55 this scholarship was awarded to Kathryn Anne Williams.

Laura K. Carr Scholarship.—Six scholarships in the amount of \$500 each and eight of \$100 each, established in 1932 by Mrs. Laura K. Carr, are available to "young men (of the white race) for undergraduate or postgraduate work, considering character, capacity, and need".

Maria M. Carter Scholarship.—This scholarship in the amount of \$100, established in 1871 by Mrs. Maria M. Carter, is available to a young man.

Isaac Davis Scholarship.—This scholarship, in the amount of \$80, was established in 1869 by the Honorable Isaac Davis of Massachusetts. Nominations for the scholarship may be made "by the founder or his eldest blood descendant". In case no such nomination is made, the scholarship is to be awarded by the University.

Hazleton Scholarship.—This scholarship, in the amount of \$300, established in 1930 by the bequest of Lillie S. Hazleton, is awarded annually "for the use and assistance of needy and worthy students".

Eugene and Agnes E. Meyer Scholarship.—A scholarship fund in the amount of \$2,500, established in 1952 by the Eugene and Agnes

E. Meyer Foundation, is available annually "to assist promising students or applicants in meeting the costs of furthering their education, with preferential consideration to children of persons who are employed in public service, including service in the armed forces or the judiciary."

John Ordronaux Prize.—This prize of \$150 is awarded annually to the member of the graduating class of the School of Medicine who has completed the four year medical course with the highest scholastic standing. In 1954-55 this prize was awarded to Solomon Efrem Barr.

The Zonta Club of Washington, D. C., Scholarship.—This scholarship, in the amount of \$300, offered by the Zonta Club of Washington, D. C., is available to a woman who is a senior or graduate student with special interest in a professional or business career.

Special Research Scholarships, supporting part-time work in the various departments, have been made available to selected medical students through grants by the Lederle Laboratories, the National Foundation for Infantile Paralysis, and the National Institutes of Health.

FINANCIAL AID

INTERNSHIP

In memory of her mother, Anna Bartsch, Dr. Anna Bartsch-Dunne established in 1946 a fund which provides \$15 a month to aid in the support of an internship in the University Hospital. This internship, awarded annually, was awarded for the year 1954-55 to Louise Friend.

LOAN FUNDS

The following loan funds are available to students in the University in accordance with the qualifications placed thereon by the donors. Inquiries should be directed to the Office of the Treasurer.

University Loan Fund.—The Trustees of The George Washington University have established a loan fund.

Harris Loan Fund.—This fund, established by George W. Harris, is available for loan to an orthoptic technician student.

Kellogg Medical School Loan Fund.—The W. K. Kellogg Foundation in Battle Creek, Michigan, has established a loan fund for students in the School of Medicine.

School of Medicine Loan Fund.—This fund, contributed by medical students, is available for loans to students in the School of Medicine.

Pfizer Medical School Loan Fund.—The Chas. Pfizer & Co., Inc., has established a fund for loans to students in the School of Medicine.

Henry Strong Educational Foundation.—The Henry Strong Educational Foundation, established at Chicago under the will of General

Henry Strong, makes available a fund for loans to both men and women students under the age of twenty-five years.

Sutherland Medical School Loan Fund.—This fund, established by Mrs. Rose L. Sutherland, is available for loans to students in the School of Medicine.

REGULATIONS

Students in the School of Medicine are subject to, and are expected to familiarize themselves with, the general University regulations, dated in the University Catalogue.

ABSENCE

Absence consists in being away from a class or clinic during a scheduled period, entering after the class or clinic has begun, or leaving before either is dismissed.

Excuse for absence due to sickness must be accompanied by a certificate signed by the attending physician and must be filed in the Office of the Dean.

For every unexcused absence a department will deduct one-half of one per cent from the student's final grade in the subject involved.

GRADES

The following grading system is used *A* (90-100); *B* (80-89); *C* (75-79); *D* (65-74) condition; *F* (below 65) failure; *Inco.* incomplete. The passing grade in each subject is *C*.

A student conditioned in any subject will not be advanced until such condition is removed and then only by authority of the Committee on Scholarship.

EXAMINATIONS

Examinations, which may be written, oral, or practical, will be held at the end of each term.

All students in the School of Medicine are required to take Part I and Part II of the National Board Examinations, except that students from those states and foreign countries which do not recognize the National Board may be exempted from Part II by action of the Committee on Scholarship.

APPLICATION FOR GRADUATION

Application for a degree should be filed in the Office of the Registrar at the time of registration for the senior year.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

HEALTH ADMINISTRATION

The University maintains a health service that is primarily diagnostic in its intent. It also provides first aid in the event of an emergency.

Medical privileges include: (1) the physical examination of all entering students; (2) three visits by the University physician or surgeon, office or residence (District of Columbia) in any one illness, exclusive of a specialist, surgical operation, laboratory, or X-ray examination; (3) hospitalization, including board and nursing in the University Hospital for not more than one week during any twelve-month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration.

This medical benefit does not apply to illness or disability incurred previous to the University term or prior to payment of tuition fees.

The student is allowed, if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

Rules: (1) The Director of Health Administration is empowered to limit or deny the medical benefits where, in his discretion, a student has, by his misconduct or breach of the rules of the University, made himself ineligible; (2) the Director of Health Administration has authority to determine the necessity and length of hospitalization; (3) a student who has severed his connection with the University is ineligible for medical benefits.

PHYSICAL EXAMINATIONS

All first-year students are given a comprehensive physical examination upon admission to the School of Medicine. The students are informed of the findings and advised regarding such measures as will tend to maintain a high standard of health.

In addition medical students benefit from the complete Tuberculosis

Case Finding Program which the School has maintained since 1938-39. Under this program all students receive tuberculin tests, X-ray examinations, and such special attention from chest specialists as is necessary to reduce to a minimum the dangers from tuberculosis. Students are immunized against those diseases for which proven prophylactics exist.

LIVING ACCOMMODATIONS AND LIVING EXPENSES

Washington provides a wide variety of residential accommodations for students, rooms, apartments, and houses, furnished and unfurnished, at a wide range of rentals. Married students are eligible for various low rental housing projects. Single students frequently find they can live economically in small groups by sharing apartments. The cost of food, clothing, and other essentials in Washington is comparable to that in other cities.

LIVING ACCOMMODATIONS

Women Students.—The Hattie M. Strong Residence Hall provides single rooms at \$35 a month and double rooms at \$40 a month a person. Meals are served at the Student Union. Admission to the University does not include dormitory reservation. A separate application for a room should be made well in advance (for the fall term by May first, for the spring term by January first). Forms for application, together with detailed information, may be obtained from the Director of Activities for Women.

Girls under the age of twenty-one who are enrolled for twelve or more credit hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory, except with persons approved by the Director of Activities for Women.

Men Students.—Welling Hall provides double room facilities for 102 students. Rooms rent for \$24 a month a person. Dining facilities are available to all residents. Meals are also served at the Student Union. Application forms for reservations may be obtained from the Director of Activities for Men.

Information concerning private rooming and boarding facilities near the University for women students twenty-one years of age or older and for men students may be obtained at the Housing Office, Lisner Auditorium, 730 Twenty-first Street, NW. The reservation of rooms in private houses must be made by students.

RECREATION

The nation's capital provides abundant recreational resources, a large number of which are available at little or no cost. There are numerous art galleries, museums, concert halls, theaters, swimming pools, parks and places of great historic interest. There are, in addition, the usual commercial recreation facilities found in a large city. Social activities are provided by student organizations of the University, the School of Medicine, and other student groups. Almost every religious faith is represented in Washington by one or more churches, and much spiritual, educational, social, and recreational activity is conducted by the various church groups. There are innumerable other cultural and educational facilities in Washington to meet almost any possible individual need or preference of a medical student and his family.

THE DEGREE OF DOCTOR OF MEDICINE

Upon the satisfactory completion of the requirements of the School of Medicine, the degree of Doctor of Medicine is conferred.

REQUIREMENTS FOR THE DEGREE

Every candidate for graduation with the degree of Doctor of Medicine must be at least twenty-one years of age, of reputable character, and free of all indebtedness to the University. He must have satisfied the admission requirements, completed satisfactorily not less than four academic years of study as a matriculated student in Medicine, completed all required courses, and passed satisfactorily all prescribed examinations.

COMBINED ARTS AND MEDICINE CURRICULUM

In order to be recommended for the degree of Bachelor of Arts, the candidate must complete at least ninety credit hours of prescribed college work (at least thirty credit hours) and one year of residence must be completed in Columbian College, the senior liberal arts college, and the first year of the medical curriculum. Upon satisfactory completion of the fourth year of the medical curriculum the student becomes eligible for the degree of Doctor of Medicine.

HONORS

A candidate who has completed the four-year medical course with an average grade of *A* may be recommended for graduation "with distinction."

HONOR SOCIETIES

William Beaumont Medical Society.—Medical students showing unusual ability are elected by the active members of this society, which was founded to encourage and stimulate individual investigation.

Howard Kane-A. F. A. King Obstetrical Society.—The fifteen students in the third and fourth year classes who maintain the highest grades in their work in obstetrics are eligible for membership.

Smith Reed Russell Society.—Students of the third and fourth years who maintain a scholastic average of 88 per cent are eligible for membership.

Alpha Omega Alpha—National Honor Medical Society. Members of the Junior and Senior Classes meeting the qualifications specified by the constitution of the Society are eligible for election to membership.

INTERN AND RESIDENT TRAINING PROGRAM

The George Washington University Hospital offers rotating type internships as classified by the National Intern Matching Program, Inc. Twenty-five internships of one year each are offered; thirteen in the Department of Medicine with emphasis on medicine, ten in the Department of Surgery with emphasis on Surgery, and two in the Department of Pathology with emphasis on pathology.

Rotating Internships, Emphasis on Medicine.—Interns will be assigned to seven months of general medicine, two months on the surgical service, and one month each on neuro-psychiatry, pediatrics, and obstetrics and gynecology.

Rotating Internships, Emphasis on Surgery.—Interns will be assigned to the surgical service for nine months, to general medicine for two months, and to obstetrics and gynecology for one month.

Rotating Internships, Emphasis on Pathology.—Interns will be assigned to the pathology service for eight months, to general medicine for two months, and to surgery for two months.

A total of approximately forty-two approved residencies are offered in anesthesiology, cardiac diseases, internal medicine, neurologic surgery, obstetrics-gynecology, oral surgery, pathology, physical medicine, psychiatry, roentgenology, surgery and thoracic surgery. Residency programs are of from one to four years depending upon the service. Appointments are for one year subject to renewal. In several of the fields there are affiliations with local and government hospitals.

Fellowships of one or two years are available to acceptable candidates in anesthesiology, cardiology, chest diseases, infectious diseases, outpatient service, physical medicine, rheumatic diseases, surgery and thoracic surgery.

For application blanks and further information, address the Super-

intendent, The George Washington University Hospital, Washington 7, D. C.

POSTGRADUATE INSTRUCTION

The School of Medicine offers annually a series of short intensive postgraduate courses, varying somewhat from year to year. The series is designed for physicians in practice. The significant advances in the various specialties are presented together with summaries of older information.

The Kellogg Medical Lectures, inaugurated in 1948, are a series of evening lectures and clinics, presented by distinguished physicians from other cities, designed primarily for physicians practicing in Washington and the vicinity. They are also attended by the Faculty, postgraduate students, and members of the senior class of the School of Medicine.

During the academic year 1953-54 approximately 168 physicians were enrolled in postgraduate courses. For application blanks and further information, address the Director of Postgraduate Instruction, The George Washington University Hospital, Washington 7, D. C.

MEDICAL TECHNOLOGIST COURSE

The course for medical technologists consists of twelve consecutive months of didactic and practical work in all phases of clinical laboratory technique. The course meets the full requirements of the Registry of Medical Technologists of the American Society of Clinical Pathologists. Prerequisites are 60 credit hours (two academic years) of college work including required credits in biology and chemistry.

Two classes are accepted each year, one entering in September and the other in March. Enrollment in each class is strictly limited so that personal instruction can be given.

Upon satisfactory completion of the course a certificate is awarded and the candidate is eligible for the certifying examination given by the Registry of Medical Technologists.

For application blanks and further information, address the Director of Laboratories, The George Washington University Hospital, Washington 7, D. C.

COURSES OF INSTRUCTION

On the following pages of this BULLETIN, under the alphabetically arranged names of the departments of instruction, are listed the courses of instruction offered by the School of Medicine. The School of Medicine serves other divisions of the University by making available to non-medical students certain undergraduate and graduate courses in the following fields: Anatomy, Bacteriology, Biochemistry, Pathology, Pharmacology, Physical Medicine, and Physiology. The courses listed are subject to some slight change. The University reserves the right to withdraw any course announced.

EXPLANATION OF COURSE NUMBERS AND SYMBOLS

The number which precedes the name of a course indicates the term of the academic year in which the course is offered. An odd number indicates that the course is offered in the fall term; an even number, that it is offered in the spring term; and a double number (e.g., 343-44), that it begins in the fall term and continues in the spring.

A number in parentheses after the name of a course, indicates credit hours which may be earned by nonmedical students.

First-year courses are numbered from 101 to 200; second-year courses, from 201 to 300; third-year courses, from 301 to 400; and fourth-year courses, from 401 to 500.

Courses offered in the School of Medicine for nonmedical students.—Courses numbered from 101-200 are planned for upper-division students in undergraduate curricula. They may be created toward higher degrees only when registration for graduate credit has been approved at the beginning of the course by the dean responsible for the graduate work and by the officer of instruction, and when the completion of additional work has been certified by the officer of instruction. Courses numbered from 201 to 500 are planned for graduate students.

ANATOMY

- Ira Rockwood Telford, Ph.D., *Professor of Anatomy, Executive Officer*
 Webb Edward Havmaker, M.D., M.S., *Professional Lecturer in Anatomy*
 *Paul Calabrist, A.M., *Associate Professor of Anatomy*
 Ivor Cornman, Ph.D., *Assistant Research Professor of Anatomy*
 Gerald Fred Hungerford, Ph.D., *Assistant Professor of Anatomy*
 Frank Duane Allan, Ph.D., *Assistant Professor of Anatomy*
 Thomas Nick Johnson, Ph.D., *Assistant Professor of Anatomy*
 Wilfred Walter Eastman, B.S., M.D., *Clinical Instructor in Anatomy*
 Lloyd Eugene Church, D.D.S., M.S., *Clinical Instructor in Anatomy*
 Raymond Nathan Brown, M.D., *Clinical Instructor in Anatomy*
 William Mowery, A.B., M.D., *Clinical Instructor in Anatomy*
 Lysle Westley Williams, A.B., M.D., *Clinical Instructor in Anatomy*
 Dora Papara Nicholson, M.D., *Fellow in Anatomy*

101-2 *Gross Anatomy*

Hungerford and Staff

Regional dissection of the human body, supplemented with lectures and joint sections. Study of X-ray anatomy to emphasize the functional aspects of the position, shape, and reaction of the viscera and skeletal components. Eighteen hours a week, fall term, nine hours a week, spring term.

103 *Human Embryology*

Allan and Staff

The origin and development of the human body. Special emphasis on the value of embryology in interpreting anatomical anomalies and variations as seen in gross dissection, history, obstetrics, and pathology. Three hours a week.

104 *Neuroanatomy*

Johnson and Staff

The macroscopic and microscopic study of the central nervous system and the visceral sensory organs. Emphasis on such dynamic aspects as development, pathways, lesions, etc. Six hours a week.

105 *Microscopic Anatomy*

Telford and Staff

Study of the detailed minute structure of cells, tissues, and organs of the human body, with emphasis on the relation of structure to function. Recognition and interpretation of histological sections tested by practical examinations. Six hours a week.

201-2 *Gross Anatomy (S-6)*

Hungerford and Staff

For qualified nonmedical graduate students. Same as Anatomy 101-2. Laboratory fee, \$35. Time to be arranged.

203 *Human Embryology (2)*

Allan and Staff

For qualified nonmedical graduate students. Same as Anatomy 103. Laboratory fee, \$5. Time to be arranged.

* On leave of absence 1954-55

- 204 *Neuroanatomy* (4) Johnson and Staff
For qualified nonmedical graduate students. Same as Anatomy 104
Laboratory fee, \$10. Time to be arranged.
- 205 *Microscopic Anatomy* (4) Telford and Staff
For qualified nonmedical graduate students. Same as Anatomy 105
Laboratory fee, \$10. Time to be arranged.
- 221-22 *Seminar* (1-1) The Staff
Reports and discussions of special topics by the Staff and graduate students. For graduate liberal arts students. Regular meeting; students are encouraged to attend. One hour a week. Time to be arranged.
- 295-96 *Research* (arr.) The Staff
Time, credits, and fees to be arranged.
- 299-300 *Thesis* (3-3) The Staff

ANESTHESIOLOGY

Charles Seymour Coakley, M.D., *Professor of Anesthesiology, Executive Officer*

Donald Harrison Stubbs, A.M., M.D., *Clinical Professor of Anesthesiology*

Seymour Alpert, A.B., M.D., *Associate Professor of Anesthesiology*

Salomon Naphtali Albert, A.B., M.D., D.A., *Clinical Instructor in Anesthesiology*

William Eldridge Bageant, M.D., *Clinical Instructor in Anesthesiology*

Allen Widome, M.D., *Clinical Instructor in Anesthesiology*

Paula Reines Kaiser, M.B., Ch.B., M.D., *Fellow in Anesthesiology*

322 *Anesthesiology*

Review of basic sciences, correlation between basic sciences and clinical work. One hour a week. The Staff

421-22 *Anesthesia Seminar*

Students attend anesthesia seminar during their clinical clerkships. One hour a week. The Staff
University Hospital

433-34 *Advanced Anesthesiology*

Students are rotated through the work of the department for a period of one week and assigned to work in the operating rooms and to attend conferences and seminars. For the more advanced students a three-week elective is offered. The Staff

BACTERIOLOGY, HYGIENE, AND PREVENTIVE MEDICINE

Leland Wilbur Parr, Ph.D., *Professor of Bacteriology, Executive Officer*
 Angus MacIvor Griffin, Ph.D., *Professor of Bacteriology*
 Ralph Gregory Beachley, M.D., Dr.P.H., *Adjunct Professor of Public Health Practice*
 Mary Louise Robbins, Ph.D., *Associate Professor of Bacteriology*
 William Gray McCarten, M.S., *Assistant Professor of Bacteriology*
 Rudolph Hugh, Ph.D., *Assistant Research Professor of Bacteriology*
 Charles Francis McCaffrey, M.D., *Clinical Instructor in Preventive Medicine and Public Health*
 Vernon Jack Fuller, M.S., *Sanders Fellow in Bacteriology*
 Andrew John Vargosko, Jr., M.S., *Fellow in Bacteriology*
 William Donald Hann, B.S., *Fellow in Bacteriology*
 Nazar el Shawi, B.S., *Research Fellow in Bacteriology*
 Melvin Santer, Ph.D., *Research Fellow in Bacteriology*

SPECIAL LECTURERS

Chester Wilson Emmons, Ph.D., *Chief, Medical Mycology Unit, Laboratory of Infectious Diseases, National Microbiological Institute, National Institutes of Health; Medical Mycology*
 Willard Hull Wright, D.V.M., Ph.D., *Chief, Laboratory of Tropical Diseases, National Microbiological Institute, National Institutes of Health; Medical Zoology*
 John Roderick Heller, Jr., B.S., M.D., *Director, National Cancer Institute, National Institutes of Health; Cancer Control*
 Carl John Lauter, M.S., *Senior Chemical Engineer, Corps of Engineers, United States Army; Environmental Sanitation*
 Robert Carter Cook, *Director, Population Reference Bureau; Editor, Journal of Heredity; Medical Genetics*
 Robert Hanna Felix, M.D., M.P.H., *Director, National Institute of Mental Health, National Institutes of Health; Mental Hygiene*
 Francis Byron Gordon, Ph.D., M.D., *Chief, Virus and Rickettsia Division, Chemical Corps Biological Laboratories, Camp Detrick; Virology*
 Edward Kraemer Funkhouser, B.S., *Executive Secretary, District of Columbia Tuberculosis Association; Community Health Resources*
 Samuel Jacob Ail, Ph.D., *Chief, Microbiological Chemistry, Department of Bacteriology, Army Medical Service Graduate School; Microbiological Chemistry*

Sarah Bishop Brooks, R.N., B.S. in P.H.N., *Director, Division of Public Health Nursing, Arlington County Health Department; Public Health Practice*

Martin Marc Cummings, B.S., M.D., *Chief, Research and Education Service, Department of Medicine and Surgery, Veterans Administration; Medical Bacteriology*

112 *General Bacteriology* (4) Robbins

For premedical students. A study of the fundamentals of bacteriology, including systemic applications. Methods of cultivation and control of several groups of microorganisms are studied in the laboratory. Prerequisite: see Biology laboratory science Chemistry 11-12. Laboratory fee, \$5. Tues., Thurs., and Sat., 9:10 to 11:00 A.M.

209 *Medical Microbiology* (1-11) Perry, Griffin

Bacteria, rickettsia, viruses, yeasts, molds, protozoa, and parasites which relate to the health and disease of man—clinical study of most important forms, methods of diagnosis by microscopic, cultural, immunologic, and animal inoculation. Theory and methods of treatment, prophylaxis, vaccine production. Open to students preparing graduate or graduate work in the above or in part by adding the appropriate course to the course number, with credit allocated as follows: 141 Bacteriology, including rickettsia and virus-inoculation (4); laboratory (1); 142 Parasitology, including medical mycology (4); laboratory (1); 143 Immunology (1). May be taken by a limited number of students for Master's degree. Laboratory fee \$5 for each credit hour of laboratory work. Time to be arranged.

210 *Fundamentals of Epidemiology and Public Health* (2) Perry and Staff

Source, modes, and transmission of infection and injury. Consideration also given the problems of accidents and industrial infection. Open to liberal arts graduate students. Prerequisite: microbiology 112 or 209. Mon., 2:00 to 4:00 P.M.

210-20 *Advanced Microbiology* (arr.) Griffin and Staff

Special study of advanced methods and current problems in bacteriology for students enrolled in advanced work in microbiology, parasitology. Bacteriology 112 or 209 and Chemistry 151-52 or the equivalent completion of the laboratory. Laboratory fee, \$5 a credit hour. Time and course to be arranged.

220 *Virology* (6) Robbins

Study of viruses and virology. Lectures and laboratory training. For liberal arts graduate students. Prerequisite: Bacteriology 112 or 209 and completion of the laboratory. Laboratory fee, \$10. 1934-35 and alternate years. Time to be arranged.

230 *Statistics in Microbiology* (1) Griffin

The application of statistical methods to the problems of microbiology. For liberal arts graduate students. Prerequisite: course in elementary college algebra. 1935-36 and alternate years.

- 232 *Immunological Methods* (3) Griffin
Preparation and testing of serological materials. Demonstration of basic serological phenomena. For liberal arts graduate students. Prerequisite: Bacteriology 112 or 202 and possession of the anatomical Laboratory fee, \$6. 1954-55 and alternate years. Time to be arranged.
- 240 *Advanced Epidemiology and Public Health* (3) Part
Conferences, readings, and problems for graduate students during with specialized and advanced phases of the topics presented in Bacteriology 210. Prerequisite: Bacteriology 210. 1955-56 and alternate years.
- 293-94 *Staff Seminar* (1-1) The Staff
For liberal arts graduate students. Bi-weekly throughout the year. Time to be arranged.
- 295-96 *Research in Bacteriology* (all.) The Staff
Time and credits to be arranged.
- 299-300 *Thesis* (3-3) The Staff
- 340 *Health Resources Survey* Beachley and Staff
A survey of complete medical care from first contact, through laboratory and clinical diagnosis, adequate medical or surgical treatment to full family and community rehabilitation. Case histories assigned junior students with the cooperation and assistance of the clinical departments. Comparison is to be made between care in extended facilities and care in facilities where the student made his private practice. Emphasis is on coordination of the private practice of medicine and community public health and welfare activities, both tax supported and voluntary. Throughout the holistic point of view is assumed. One hour a week for three weeks and independent research during summer.
- 401 *Public Health Practice* Beachley and Staff
Study of public health practice at national, state, city, and county levels. Public and private agencies. One hour a week for eight weeks.

BIOCHEMISTRY

- Joseph Hyram Roe, Ph.D., *Professor of Biochemistry, Executive Officer*
 Carleton Raymond Treadwell, Ph.D., *Professor of Biochemistry*
 William Henry Sebrell, Jr., M.D., *Professorial Lecturer on Nutrition*
 Bernard Leonard Horecker, Ph.D., *Professorial Lecturer on Enzymes*
 Benjamin Williams Smith, Ph.D., *Assistant Professor of Biochemistry*
 Robert Allen Clayton, Ph.D., *Assistant Professor of Biochemistry*
 Klaus Schwarz, M.D., *Associate in Biochemistry*
 Harold William Clark, Jr., Ph.D., *Associate in Biochemistry*
 Norman Philip Goldstein, A.M., M.D., *Associate in Biochemistry*
 Tze Tung Tang, Ph.D., *Fellow in Biochemistry*
 David Walker Lum, M.S., *Sandery Fellow in Biochemistry*
 George Vartkes Vahouny, B.S., *Sandery Fellow in Biochemistry*
 Nicholas Vincent Carroll, B.S., *Fellow in Biochemistry*

- 113-14 *Biochemistry* Roe and Staff
 Physiological and clinical chemistry. Two lectures, one conference hour, and two three-hour laboratory periods a week.
- 221-22 *Biochemistry* (4-4) Treadwell
 A lecture and laboratory course for premedical students. Prerequisite: Chemistry 22 and 192. Material fee, \$12 a term. Tues. and Thurs. 9:00-10:15 A.M. and 1:00-2:00 P.M.
- 224 *Biochemistry of the Enzymes* (1) Horecker
 Lecture course dealing with the biochemistry of the various and enzyme reactions. Prerequisite: Biochemistry 111 or 221. Mon. 5:00 P.M.
- 225 *Biochemical Preparations* (3) The Staff
 For fourth and graduate students. Material fee, \$12. Time to be arranged.
- 226 *Biochemical Laboratory Methods* (3) The Staff
 For liberal arts graduate students. Material fee, \$12. Time to be arranged.
- 227-28 *Biochemistry Seminar* (1-1) Roe
 The current literature in the field of biochemistry, mainly for graduate students, but open to a limited number of specially qualified medical students. Fri. 4:00 P.M.
- 231 *Proteins and Amino Acids* (1) Roe
 A lecture course for liberal arts graduate students. Prerequisite: Biochemistry 114 or 222. 1954-55 and alternate years. Mon. 9:00 A.M.
- 231 *Carbohydrate Metabolism* (1) Roe
 A lecture course. Prerequisite: Biochemistry 224 or 222. 1954-55 and alternate years. Sat. 9:00 A.M.

- 261 *Biochemistry of the Lipids* (1) Treadwell
A lecture course. Prerequisite: Biochemistry 114 or 222. 1955-56
and alternate years.
- 295-96 *Research in Biochemistry* (arr.) Roe, Treadwell
Time and credits to be arranged
- 299-300 *Thesis* (3-3) Roe, Treadwell
- 404 *Applied Nutrition* (1) Sebrell
For senior medical students and graduate students. Lecture course
upon dietary requirements, deficiency diseases, and therapeutic diets.
Prerequisite: Biochemistry 113 or 221. Sat., 9.00 A.M.

DERMATOLOGY AND SYPHILOLOGY

Harry Ford Anderson, M.D., *Professor of Dermatology and Syphilology.*
Executive Officer

George William Creswell, A.B., M.D., *Assistant Clinical Professor of Dermatology and Syphilology*

Hayden Kirby-Smith, B.S., M.D., *Assistant Clinical Professor of Dermatology and Syphilology*

Theodore Claremont Chen Fong, M.D., *Associate in Dermatology and Syphilology*

James Quincy Gant, Jr., M.S., M.D., *Associate in Dermatology and Syphilology*

Wendell Melvin Willett, M.D., *Associate in Dermatology and Syphilology*

Reuben Goodman, M.D., *Clinical Instructor in Dermatology and Syphilology*

313-14 *Dermatology and Syphilology* The Staff
Lectures on diseases of the skin and syphilis. One hour a week.

316 *Neurosyphilis* Fong
Lectures, clinical demonstrations and practical diagnostic and therapeutic procedures.

317-18 *Clinic* The Staff
Case demonstrations, diagnosis and treatment of skin diseases and syphilis. D. C. General Hospital.

407-8 *Clinic* The Staff
Dermatology and syphilology in infants and children. Two hours a week. Children's Hospital.

409-10 *Clinic* The Staff
Clinical demonstrations, diseases of the skin. Two hours a week. University Hospital.

MEDICINE

Walter Andrew Bloedorn, A.M., M.D., Sc.D., *Professor of Medicine*
 Thomas McPherson Brown, A.B., M.D., *Professor of Medicine, Executive Officer*

Charles Robert Lee Halley, A.B., M.D., *Clinical Professor of Medicine*
 Clayton Bernard Ethridge, M.D., *Clinical Professor of Medicine*
 Louis Katz Alpert, B.S., M.D., *Clinical Professor of Medicine*
 Sol Katz, B.S., M.D., *Adjunct Clinical Professor of Medicine*
 Joseph Francis Fazekas, B.S., M.D., *Adjunct Clinical Professor of Medicine*

Harry Eagle, A.B., M.D., *Professional Lecturer in Medicine*
 Robert William Berliner, B.S., M.D., *Professional Lecturer in Medicine*
 Henry Field, Jr., M.D., *Professional Lecturer in Medicine*
 John Coleman Nunemaker, M.S., M.D., *Professional Lecturer in Medicine*

Montee James Romansky, A.B., M.D., *Associate Professor of Medicine*
 Peter Dionisius Comandreas, B.S., M.D., M.S. in Med., *Associate Clinical Professor of Medicine*

John McCallum Evans, A.B., M.D., *Associate Clinical Professor of Medicine*

Clarence Richard Hartman, A.B., M.D., *Associate Clinical Professor of Medicine*

Walter Kendall Myers, B.S., M.D., *Assistant Clinical Professor of Medicine*

John Alton Reed, A.B., M.D., *Assistant Clinical Professor of Medicine*
 Theodore Judson Abernethy, B.S., M.D., *Assistant Clinical Professor of Medicine*

William Travis Gibb, Jr., A.B., M.D., *Assistant Clinical Professor of Medicine*

Ray Hertz, Ph.D., M.D., *Assistant Clinical Professor of Medicine*

Alfred Henry Lawton, M.D., Ph.D., *Assistant Clinical Professor of Medicine*

Samuel Ross Taggart, M.D., *Assistant Clinical Professor of Medicine*

Benjamin Manchester, M.D., *Assistant Clinical Professor of Medicine*

Pearl Holly, M.S., M.D., *Assistant Clinical Professor of Medicine*

James Joseph Feffer, A.B., M.D., *Assistant Clinical Professor of Medicine*

John Watkins Tross, A.B., M.D., *Assistant Clinical Professor of Medicine*

Albert David Kistin, A.M., M.D., *Assistant Clinical Professor of Medicine*

- Andrew Gabriel Prandoni, B.S., M.D., *Assistant Clinical Professor of Medicine*
- Ruth Hechler Wichelhausen, M.D., *Assistant Clinical Professor of Medicine*
- Ludwig George Lederer, M.D., Ph.D., *Assistant Clinical Professor (Research) of Medicine*
- John Eldrid Smith, A.B., M.D., *Assistant Clinical Professor (Research) of Medicine*
- Maurice Protas, A.B., M.D., *Associate in Medicine*
- John Minor, A.B., M.D., *Associate in Medicine*
- Lawrence Jay Thomas, B.S., M.D., *Associate in Medicine*
- Lawrence Elias Putnam, A.B., M.D., *Associate in Medicine*
- Bernard Lauriston Hardin, Jr., A.B., M.D., *Associate in Medicine*
- Charles William Ordman, A.B., M.D., *Associate in Medicine*
- Benjamin Calloway Jones, Jr., A.B., M.D., *Associate in Medicine*
- Richard Bernard Castell, A.B., M.D., *Associate in Medicine*
- Myer Harold Stolar, B.S., M.D., *Associate in Medicine*
- Sam Thompson Gibson, B.S., M.D., *Associate in Medicine*
- Walter Lewis Nalls, B.S., M.D., *Associate in Medicine*
- Alfred Brighuho, M.D., *Associate in Medicine*
- Halla Brown, M.D., *Associate in Medicine*
- Ralph Bretnev Miller, A.B., M.D., *Associate in Medicine*
- Thomas Stone Sappington, A.B., M.D., *Associate in Medicine*
- John Christian Ransmeier, A.B., M.D., *Associate in Medicine*
- Monte Arnold Greer, A.B., M.D., *Associate in Medicine*
- Samuel Jacob Nathan Sugar, Ph.D., M.D., *Associate in Medicine*
- Joseph Ney, B.S., M.D., *Associate in Medicine*
- Joseph Beinstein, A.B., M.D., *Associate in Medicine*
- Frank Solomon Bacon, B.S., M.D., *Associate in Medicine*
- Henry Dunlop Ecker, B.S., M.D., *Associate in Medicine*
- Jack Jacob Rheingold, A.B., M.D., *Associate in Medicine*
- Irene Gorski Tamagna, M.D., *Associate in Medicine*
- Elizabeth Harman Hill, M.D., *Associate in Medicine*
- John Bayne Marbury, M.D., *Associate in Medicine*
- Louis Ross, M.D., *Associate in Medicine*
- Frederic Dunbar Chapman, A.B., M.D., C.M., *Associate in Medicine*
- John Wilmer Latimer, Jr., M.D., *Associate in Medicine*
- Luther Henry Snyder, A.B., M.D., *Associate in Medicine*
- Charles Wilson Jones, A.B., M.D., *Associate in Medicine*
- Thomas Joseph Pekin, B.S., M.D., *Associate in Medicine*
- Robert George Taylor, M.D., *Associate in Medicine*
- Charles Waters Thompson, M.D., *Associate in Medicine*
- James Walling Long, M.D., *Associate in Medicine*
- Eugene Solomen Gladston, B.S., M.D., *Associate in Medicine*

- Maurice Mensh, M.D., *Associate in Medicine*
 Arthur Rosenbaum, B.S., M.D., *Associate in Medicine*
 Thomas James Kennedy, Jr., B.S., M.D., *Associate (Research) in Medicine*
 Adrian Michael Hogben, M.D., Ph.D., *Associate (Research) in Medicine*
 Jack Orloff, M.D., *Associate (Research) in Medicine*
 Ernest Cotlove, B.S., M.D., *Associate (Research) in Medicine*
 James Irving Boyd, M.D., M.S., *Lecturer in Medicine*
 James Theodore Burns, M.D., *Clinical Instructor in Medicine*
 Irvin Kerlan, B.S., M.D., C.P.H., *Clinical Instructor in Medicine*
 Virginia Patterson Beelar, A.B., M.D., *Clinical Instructor in Medicine*
 Lester Sylvan Blumenthal, A.B., M.D., M.S. in Med., *Clinical Instructor in Medicine*
 Charles Edward Law, M.D., *Clinical Instructor in Medicine*
 Emil Herbert Bauersfeld, A.B., M.D., *Clinical Instructor in Medicine*
 Stanley William Kirstein, B.S., M.D., *Clinical Instructor in Medicine*
 James Francis Ambury, B.S., M.D., *Clinical Instructor in Medicine*
 William Otis Bailey, Jr., M.D., *Clinical Instructor in Medicine*
 Harry Clark Bates, B.S., M.D., *Clinical Instructor in Medicine*
 Robert Norwood Coale, B.S., M.D., *Clinical Instructor in Medicine*
 Israel Kessler, M.S., M.D., *Clinical Instructor in Medicine*
 Francis James Murray, B.S., M.D., *Clinical Instructor in Medicine*
 Edwin Pearson Parker III, B.S., M.D., *Clinical Instructor in Medicine*
 Morris Hirsch Rosenberg, A.B., M.D., *Clinical Instructor in Medicine*
 Jeanne Conle Bateman, A.B., M.D., *Clinical Instructor in Medicine*
 John William Du Chet, M.D., *Clinical Instructor in Medicine*
 Thomas Louis Harrison, A.M., M.D., *Clinical Instructor in Medicine*
 Boris Rakkin, A.B., M.D., *Clinical Instructor in Medicine*
 Morton Harold Rose, M.D., *Clinical Instructor in Medicine*
 George Sharpe, A.B., M.D., *Clinical Instructor in Medicine*
 Warren Daniel Brill, B.S., M.D., *Clinical Instructor in Medicine*
 Marvin Fuchs, B.S., M.D., *Clinical Instructor in Medicine*
 Frank Goodnow Mac Murray, A.B., M.D., *Clinical Instructor in Medicine*
 William Jack Weaver, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 Ruth Bowditch Benedict, A.B., M.D., *Clinical Instructor in Medicine*
 Cyril Augustus Schulman, B.S., M.D., *Clinical Instructor in Medicine*
 Louis Alrick Craig, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 Abraham Wolfe Danish, A.B., M.D., *Clinical Instructor in Medicine*
 Milton Guisek, A.B., M.D., *Clinical Instructor in Medicine*
 William Lewis, M.D., *Clinical Instructor in Medicine*
 Alvin Seltzer, B.S., M.D., *Clinical Instructor in Medicine*
 Adolph Friedman, A.B., M.D., *Clinical Instructor in Medicine*

- Samuel Dennis Loube, A.B., M.D., *Clinical Instructor in Medicine*
 Alvin Edward Parrish, M.D., *Clinical Instructor in Medicine*
 Nahum Raphael Shulman, M.D., *Clinical Instructor in Medicine*
 Stewart William Bush, B.S., M.D., *Clinical Instructor in Medicine*
 Alfred Baer, A.B., M.D., *Clinical Instructor in Medicine*
 Jack Kleh, A.B., M.D., *Clinical Instructor in Medicine*
 James William Hollingsworth, M.D., *Clinical Instructor in Medicine*
 Edward Luke Rea, A.B., M.D., *Clinical Instructor in Medicine*
 William Robert Felts, Jr., B.S., M.D., *Clinical Instructor in Medicine*
 James Packard Mann, M.D., *Clinical Instructor in Medicine*
 Maurice Arthur Sislen, A.B., M.D., *Clinical Instructor in Medicine*
 William Holmes Crosby, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 Joseph Hicks Watson, B.S., M.D., *Clinical Instructor in Medicine*
 Conrad Gossels, M.D., *Clinical Instructor in Medicine*
 Charles Joseph Savarese, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 James Elliot Chapman, M.D., *Clinical Instructor in Medicine*
 Bernard Robert Cooperman, A.B., M.D., *Clinical Instructor in Medicine*
 Marshall Hannis Jacobson, A.B., M.D., *Clinical Instructor in Medicine*
 Gottfried Karl Dushak, M.D., *Clinical Instructor in Medicine*
 Norman Hartley Rubenstein, M.D., *Clinical Instructor in Medicine*
 Franklin Gessford Ebaugh, Jr., A.B., M.D., *Clinical Instructor in Medicine*
 Leonard Laster, A.B., M.D., *Clinical Instructor in Medicine*
 Howard Otis Mott, A.B., M.D., *Clinical Instructor in Medicine*
 Max Gimble Sherer, M.S., M.D., *Clinical Instructor in Medicine*
 Jesse Leonard Steinfeld, B.S., M.D., *Clinical Instructor in Medicine*
 Donald Morgan Watkin, A.B., M.D., *Clinical Instructor in Medicine*
 James Barnes Wengarden, M.D., *Clinical Instructor in Medicine*
 David Duvall Thompson, A.B., M.D., *Clinical Instructor in Medicine*
 Paul Alan Marks, A.B., M.D., *Clinical Instructor in Medicine*
 Martha Ray Lumpkin, A.B., M.D., *Fellow in Medicine (Cardiovascular Diseases)*
 Irene I-lien Hsu Siu, B.S., M.D., *Fellow in Medicine (Cardiovascular Diseases)*
 David Stanley Davis, A.B., M.D., *Fellow in Medicine (Infectious Diseases)*
 Harold Irwin Passes, B.S., M.B., *Fellow in Medicine (Pulmonary Diseases)*
 William Schmidt, A.B., M.D., *Fellow in Medicine (Pulmonary Diseases)*
 Bernard Howard Ostrow, A.B., M.D., *Fellow in Medicine (Cardiovascular Diseases)*

James Crawford Bruce, M.D., *Fellow in Medicine (Cardiology)*
 Mary Falorsi Watt, A.B., M.D., *Fellow in Medicine*

- 132 *History of Medicine* The Staff
 One hour a week
- 236 *Clinical Microscopy* The Staff
 Lectures and studies in the clinical application of laboratory examinations of blood, body fluids, exudates, and excreta. Three hours a week
- 241 *Physical Diagnosis I* The Staff
 Theoretical considerations of the principles of physical diagnosis. One hour a week
- 242 *Physical Diagnosis II* The Staff
 Covers not only theoretical but practical application of principles of physical diagnosis as related to examination of patients. Six hours a week
- 244 *Introduction to Medicine* The Staff
 Lectures covering the principles of internal medicine primarily in clinical studies and training in the inpatient and outpatient practice. Five hours a week
- 320 *Medical Jurisprudence* The Staff
 Lectures on the legal and ethical aspects of pharmacy, and on the legal problems with which the physician comes in contact. One hour a week for sixteen weeks
- 325-26 *Clinical Clerkships* The Staff
 Training with bed patients under individual instruction designed to develop ability in examination of patients and case taking as well as practice in clinical microscopy. Eight weeks. D. C. General Hospital
- 327-28 *Clinical Pathological Conferences I* Choisser, Brown, and Staff
 Conferences are held at the School of Medicine. Case studies are presented and discussed by the students and members of the staff. Clinical, laboratory, and therapeutic findings are discussed. One hour a week
- 332-40 *Therapeutic Conferences I* Staff of Medicine and Pharmacology
 Conferences designed to emphasize the application of pharmacological principles to the treatment of clinical medicine. Two hours a week. University and D. C. General Hospital
- 342-51 *Medical Conferences* The Staff
 Two hours a week
- 421-22 *Outpatient Clinic* The Staff
 Individual case studies under personal supervision of the staff. Daily clinic on general medical problems and various illustrative clinical aspects of disease. Individual examination and instruction in medical operations. Six weeks. University Hospital

423-24 *Clinical Clerkship*

Six weeks. University and Mt. Alto hospitals.

The Staff

427-28 *Clinical Pathological
Conferences II*

Continuation of Medicine 327-28. One hour a week.

Cholser, Brown, and Staff

431 *Forensic Medicine*

Organized in conjunction with the University Law School for the purpose of acquainting medical students with their legal responsibilities. Three hours a week for four weeks.

The Staff

NEUROLOGY AND NEUROLOGICAL SURGERY

- *Walter Freeman, Ph.D., M.D., *Professor of Neurology*
 James Winston Watts, B.S., M.D., *Professor of Neurological Surgery*
Acting Executive Officer
 Hyman David Shapiro, M.D., *Associate Clinical Professor of Neurology*
 Robert Henry Groh, B.S., M.D., *Assistant Clinical Professor of Neurology*
 Jonathan Marshall Williams, M.D., *Assistant Clinical Professor of Neurological Surgery*
 James Peter Murphy, B.S., M.D., *Assistant Clinical Professor of Neurological Surgery*
 Paul Chodoff, A.B., M.D., *Associate in Neurology*
 Hugo Victor Rizzoli, A.B., M.D., *Associate in Neurological Surgery*
 ‡George Davis Weckhardt, M.D., *Associate in Neurology*
 John Martin, M.D., Ph.D., *Associate in Neurological Surgery*
 Harvey Ammerman, B.S., M.D., *Clinical Instructor in Neurological Surgery*
 Garrett Swain, M.D., *Clinical Instructor in Neurological Surgery*
 James Francis Hammill, B.S., M.D., *Clinical Instructor in Neurology*
 Frank Lamar Creel, M.D., *Assistant in Neurology*

- 249 *Neurology (elective)* Williams
 Methods used to study the structure and function of the nervous system. Lectures and laboratory demonstrations. One hour a week.
- 250 *Neurology* Shapiro
 Introductory lectures on clinical neurology with specimens, models, slides, and roentgen pictures. One hour a week.
- 331 *Neurology and Neurological Surgery* Watts, Chodoff
 Clinical lectures and demonstrations. One hour a week.
- 333-34 *Neurology and Neurological Surgery* Groh and Staff
Clinical Clerkship
 Instruction in history, physical examination, radiology, clinical procedures. Attendance at neurological seminars. Six students in rotation, two weeks. D. C. General Hospital.
- 335-36 *Neurological Conference* Watts and Staff
 Clinical conference one afternoon a week followed by case studies. Logic study of questions from seminar material. Two and a half hours a week. Six students in rotation, two weeks. D. C. General Hospital.

* On leave of absence (1960-61)
 ‡ On medical service leave

431-32 *Neurology and Neurological Surgery* Shapiro, Rizzoli
Glinn

Neurological outpatient clinic. Consultation of staff on ambulatory cases, demonstration of diagnostic procedures, disposition of neuro-psychiatric cases, ward rounds. Six students in rotation. Two hours a week. University Hospital.

433-34 *Clinical Neurology* Groh
Neurological inpatient examinations and demonstrations. Six students in rotation. Two hours a week. St. Elizabeths Hospital.

436 *Neurological Surgery (elective)* Murphy and Staff
Lectures and motion picture demonstration of neurosurgical problems. One hour a week.

OBSTETRICS AND GYNECOLOGY

- John Parks, M.S., M.D., *Professor of Obstetrics and Gynecology, Executive Officer*
- Radford Brown, M.D., *Clinical Professor of Obstetrics and Gynecology*
- Jacob Kotz, M.D., *Clinical Professor of Obstetrics and Gynecology*
- Henry Laurant Darner, A.B., M.D., *Clinical Professor of Obstetrics and Gynecology*
- George Nordlinger, A.B., M.D., *Clinical Professor of Obstetrics and Gynecology*
- Robert Henry Barter, B.S., M.D., *Associate Professor of Obstetrics and Gynecology*
- Samuel Mayer Dodge, A.M., M.D., *Associate Clinical Professor of Obstetrics and Gynecology*
- Jeremiah Keith Croner, M.D., *Assistant Clinical Professor of Obstetrics and Gynecology*
- James Albert Dushabek, M.D., *Associate in Obstetrics and Gynecology*
- Clarence Kendall Fraser, Ph.B., M.D., *Associate in Obstetrics and Gynecology*
- Barton Winters Rahwine, M.D., *Associate in Obstetrics and Gynecology*
- Floyd Sterling Rogers, M.D., *Associate in Obstetrics and Gynecology*
- Rufus Martin Roll, A.B., M.D., *Associate in Obstetrics and Gynecology*
- Katherine Elizabeth Parker, A.M., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Julius Robert Epstein, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Morton Selwyn Kautman, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Caroline Jackson, A.M., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- William Thurston Lady, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Jed Williams Pearson, Jr., A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Samuel Hazen Shea, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Thomas Miles Leonard, Ph.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Albert Seymour Bright, M.D., *Clinical Instructor in Obstetrics and Gynecology*

- Shirley Sue Martin, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Neel Jack Price, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Roland Essig Bieren, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Alexander LeSueur Russell, M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Thomas Ashton Wilson, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Marvin Peace Footer, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Donald Walters, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Joseph Marshall Friedman, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- Leon McNeely Liverett, B.S., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- William Prentiss M. Kelway, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*
- William Hurlbert Cooper, A.B., M.D., *Clinical Instructor in Obstetrics and Gynecology*

- 254 *Normal Obstetrics*
Lectures and demonstrations on the physiology and management of normal pregnancy. One hour a week.
Footer, Dick
- 301-2 *Manikin Demonstrations*
The mechanism of labor and various types of operative delivery demonstrated to sections of the Junior class in weekly sessions. D. C. General Hospital.
Footer
- 337-38 *Abnormal Obstetrics*
Lectures and demonstrations on the complications of pregnancy. One hour a week.
Parks, Nottelager
- 343-44 *Gynecology*
Lectures and demonstrations on the principles of gynecology. One hour a week.
Brown, Darney, Barten
- 351-52 *Clinical Clerkship*
Clerkship with patients, including ward rounds, operating room demonstrations, and weekly clinic. Four weeks. D. C. General Hospital.
The Staff
- 441-42 *Clinical Obstetrics*
Students participate in prenatal and postnatal clinic case, observe the course of labor and deliver patients under supervision, attend biweekly
Parks, Barten

departmental conferences and daily ward rounds in the University and D. C. General hospitals.

443-44 *Clinical Gynecology*

Students observe and participate in the gynecological clinics and operating rooms of the University and D. C. General hospitals.

Parks, Bartel

OPHTHALMOLOGY

- Ronald Atmore Cox, A.B., M.D., *Professor of Ophthalmology, Executive Officer*
 Ernest Alfred Watson Sheppard, M.D., C.M., *Clinical Professor of Ophthalmology*
 Richard Wallace Wilkinson, M.S., M.D., *Assistant Clinical Professor of Ophthalmology*
 Carmon Robert Naples, B.S., M.D., *Associate in Ophthalmology*
 Walter Joseph Romeiko, M.D., *Associate in Ophthalmology*
 William Paxson Chantant, Jr., M.D., *Associate in Ophthalmology*
 William Joseph Graham Davis, A.B., M.D., *Associate in Ophthalmology*
 Robert Edward duPrey, B.S., M.D., *Clinical Instructor in Ophthalmology*
 Robert Day, A.B., M.D., *Clinical Instructor in Ophthalmology*
 Ralph John Carbo, Jr., A.B., M.D., *Clinical Instructor in Ophthalmology*
 Melvin Gustavus Alper, A.B., M.D., *Clinical Instructor in Ophthalmology*
 Oscar Lavine, M.D., *Clinical Instructor in Ophthalmology*

351-52 *Ophthalmology*

A lecture course presenting the principles of ophthalmology, with special reference to clinical instruction in the general practitioner. One hour a week for sixteen weeks.

The Staff

447 *Clinic*

During medical instruction, every student is given individual instruction in the ophthalmological aspects of systematic disease. University Hospital.

The Staff

OTOLARYNGOLOGY

Daniel Bruce Moffett, A.B., M.D., *Professor of Otolaryngology, Executive Officer*

William Herndon Jenkins, M.D., *Clinical Professor of Otolaryngology*

Aubrey David Fischer, M.D., *Assistant Clinical Professor of Otolaryngology*

James Jerry McFarland, Jr., B.S., M.D., *Associate in Otolaryngology*

Catharine Birch, A.B., M.D., *Clinical Instructor in Otolaryngology*

Aram Glorig, Jr., B.S., M.D., *Clinical Instructor in Otolaryngology*

Jack Louis Levine, M.D., *Clinical Instructor in Otolaryngology*

Morris Edward Krucoff, B.S., M.D., *Clinical Instructor in Otolaryngology*

Russel Smith Page, Jr., A.B., M.D., *Clinical Instructor in Otolaryngology*

Willard Beecher Walters, B.S., M.D., *Clinical Instructor in Otolaryngology*

Albert Sidney Winer, A.B., M.D., *Clinical Instructor in Otolaryngology*

351 *Otolaryngology* Moffett, Jenkins
Lectures and demonstrations on anatomy, physiology, and diseases of the ear, nose, and throat. One hour a week.

354 *Bronchoscopy* McFarland
A series of lectures on the fundamental principles and the use of instruments, including both the bronchoscope and esophagoscope. One hour a week for two weeks.

356 *Clinic* The Staff
Practical clinical instruction in the diagnosis and treatment of diseases of the ear, nose, and throat. One and one-half hours once a week. D. C. General Hospital.

PATHOLOGY

Roger Morrison Choisser, B.S., M.D., *Professor of Pathology*
 Thomas Martin Peery, A.B., M.D., *Professor of Pathology, Executive Officer*
 Daniel Leigh Weiss, A.B., M.D., *Adjunct Clinical Professor of Pathology*
 Frank Nelson Miller, B.S., M.D., *Associate Professor of Pathology*
 William Newman, A.B., M.D., *Assistant Professor of Pathology*
 Lorenz Eugene Zimmerman, A.B., M.D., *Associate in Pathology*
 William John Schewe, B.S., M.D., *Clinical Instructor in Pathology*
 Edward Clifford McGarry, A.B., M.D., *Clinical Instructor in Pathology*

SPECIAL LECTURERS

Elson Bowman Helwig, B.S., M.D., *Assistant Chief, Pathology Division, Armed Forces Institute of Pathology*
 Hans Frank Smetana, M.D., *Chief, General Pathology Section, Armed Forces Institute of Pathology*
 Elizabeth Mapelsden Ramsey, A.B., M.D., *Research Associate and Pathologist, Department of Embryology, Carnegie Institution of Washington*
 Lent Clifton Johnson, B.S., M.D., *Chief, Musculoskeletal Section, Armed Forces Institute of Pathology*

259-62 Pathology

General pathology of inflammation, degenerations, malformations, and neoplasms. Special pathology of the organs and specific diseases. The laboratory work consists of the gross and microscopic study of diseased tissue. Special emphasis is placed on the interrelationships of the various pathologic changes and their correlation with symptoms and physical signs. Four hours, ten hours a week, spring term, four hours a week.

Peery, Miller

261-62 Neurology

Students are required to attend and assist in the performance of necropsies at the University and D. C. General Hospital.

The Staff

263-64 Demonstrations in Pathology

Gross specimens on representative cases are demonstrated and discussed. One hour a week.

The Staff

265-66 Correlation of Pathology with Clinical Diagnosis

Lectures and case demonstrations are given by members of the medical, surgical, and radiologic staffs. One hour a week.

The Staff

- 267-68 *Seminars in Pathology (elective)* The Staff
Advanced lectures are presented on special topics in pathology. One hour a week.
- 320 *Medical Jurisprudence* Miller
Forensic pathology and toxicology; The legal and ethical rights and responsibilities of physicians. Legal problems in medicine. One hour a week.
- 327-28 *Clinical Pathological Conference I* Choisser, Brown, and Staff
Conferences are held at the School of Medicine. Case histories are presented and discussed by the students and members of the staff. Clinical, laboratory, and necropsy findings are compared. One hour a week.
- 427-28 *Clinical Pathological Conference II* Choisser, Brown, and Staff
Continuation of Pathology 327-28. One hour a week.
- 429-30 *Clinical Pathological Conference III* Peery, Halley
Conferences are held at the University Hospital. Attendance is required of students during their medical clerkships there. One hour a week.
- 491-92 *Surgical Pathology* Newman
Gross and microscopic surgical specimens are demonstrated and discussed. One hour a week.
- 493-94 *Pathology Clerkship* Peery, Miller, Newman
A limited number of students receive training in surgical pathology and necropsy in the laboratory of the University Hospital.

PEDIATRICS

- Preston Alexander McLendon, B.S., M.D., *Professor of Pediatrics, Executive Officer*
- Margaret Mary Nicholson, A.B., M.D., *Clinical Professor of Pediatrics*
- Edward Lewis, M.D., *Clinical Professor of Pediatrics*
- William Staton Anderson, A.B., M.D., *Clinical Professor of Pediatrics*
- Leroy Edward Hook, M.D., *Assistant Clinical Professor of Pediatrics*
- John Augustine Washington, B.S., M.D., *Associate Clinical Professor of Pediatrics*
- Reginald Spencer Lounie, M.D., *Associate Clinical Professor of Pediatrics, Psychiatry*
- Joseph Michael LePrest, B.S., M.D., *Assistant Professor of Pediatrics*
- Mabel Harlakenden Grosvenor, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- Aaron Nimetz, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- Dorothy Steidle Jaeger Lee, M.D., *Assistant Clinical Professor of Pediatrics*
- George Maksim, M.D., M.S. in Ped., *Assistant Clinical Professor of Pediatrics*
- William Allen Howard, A.B., M.D., *Assistant Clinical Professor of Pediatrics*
- John Howell Peacock, B.S., M.D., *Associate in Pediatrics*
- Maynard Irving Cohen, A.B., M.D., *Associate in Pediatrics*
- Mary Katherine Laurence Sartwell, A.B., M.D., *Associate in Pediatrics*
- Allan Bertram Coleman, M.D., *Associate in Pediatrics*
- Charles Frederick Steigler, A.B., M.D., *Associate in Pediatrics*
- Hugh Gambel Clark, A.B., M.D., *Associate in Pediatrics*
- Adrian Reinos, Jr., B.S., M.D., *Associate in Pediatrics*
- Robert Edward Martin, M.D., *Associate in Pediatrics*
- Charles Richard Walsh, B.S., M.D., *Associate in Pediatrics*
- Eva Landsberg Lewin, M.D., A.M. in P.H., *Associate in Pediatrics*
- Herbert Harold Diamond, M.D., *Clinical Instructor in Pediatrics*
- Reginald Henry Mitchell, M.D., *Clinical Instructor in Pediatrics*
- Robert Orr Worthen, M.D., *Clinical Instructor in Pediatrics*
- Emilie Annabelle Black, B.S., M.D., *Clinical Instructor in Pediatrics*
- Robert Harper Anderson, M.D., *Clinical Instructor in Pediatrics*
- Warren Godfrey Preisser, A.B., M.D., *Clinical Instructor in Pediatrics*
- Muriel Schatz Sowers, A.B., M.D., *Clinical Instructor in Pediatrics*
- William Stark, A.B., M.D., *Clinical Instructor in Pediatrics, Psychiatry*
- Roger Bergstrom, M.D., *Clinical Instructor in Pediatrics*

Margaret Frances Gutelius, A.B., M.D., *Clinical Instructor in Pediatrics*
 Sanford Leon Leikin, M.D., *Clinical Instructor in Pediatrics*
 Bennett Olshaker, A.B., M.D., *Clinical Instructor in Pediatric Psychiatry*
 Harold Taylor Yates, B.S., M.D., *Clinical Instructor in Pediatrics*
 George Joel Cohen, A.B., M.D., *Assistant in Pediatrics*
 Roland Wingate Penick, B.S., M.D., *Assistant in Pediatrics*
 James Henry Stallings, Jr., A.B., M.D., *Assistant in Pediatrics*
 Marc Lee West, B.S., M.D., *Assistant in Pediatrics*

SPECIAL LECTURER

Myron Ezra Wegman, A.B., M.D., M.P.H., *Director of Division of Education and Training of the Pan American Sanitary Bureau Regional Officer for the Americas of World Health Organization*

256 *Pediatrics*

McLendon and Staff

Lectures on physiology of the newborn, development, infant nutrition, diseases of the newborn, common ailments and system diseases in infancy and childhood. Two hours a week. Medical School.

357-58 *Clinical Clerkship—General Pediatrics*

LoPresti and Staff

Introduction to clinical pediatrics. Emphasis on bedside discussion and group seminars including the newborn. Ward rounds. Five students in rotation, two weeks. D. C. General Hospital.

359-60 *Clinical Clerkship—Contagious Diseases*

LoPresti and Staff

Conferences and bedside discussion in contagious and infectious diseases. Prevention and quarantine measures. Five students in rotation, two weeks. D. C. General Hospital.

361-62 *Clinical Conference*

McLendon and Staff

Required. Presentation and discussion by students of current patient problems. One hour a week. D. C. General Hospital.

363-64 *Ward Rounds*

Nicholson, LoPresti, and Staff

Bi-weekly ward rounds, with students and Resident Staff. D. C. General Hospital.

365-66 *Psychiatry*

Lourie and Staff

Lectures on normal behavior and emotional development. Clinical case analysis. Second, third, and fourth years.

457-58 *Clinical Clerkship*

Anderson, Bergstrom, and Staff

Full time, including assignment to night and holiday admissions. Case studies on wards under direct Resident supervision. Ward rounds with Staff and Residents. Twelve students six weeks. Children's Hospital.

459-60 *Outpatient Clinics*

Gutelius and Staff

Week in Medical and Specialty clinics including surgery, allergy, X-ray, child welfare, ophthalmology, dermatology, neurology, and child guidance. Children's Hospital.

- 461-62 *Clinico-pathological Conference* The Staff
General and pathological discussion of recent patient history and laboratory data. Once a week. Children's Hospital.
- 463-64 *Section Conferences* The Staff
Discussion of clinical problems of diagnosis and treatment of current patients. Twice a week. Children's Hospital.
- 465-66 *Section Conference* The Staff
Surgical diagnosis, pre- and post-operative management. One hour a week. Children's Hospital.
- 467-68 *Clinical Conference II* McLennan and Staff
Required. Case presentation by students. Staff and student discussion of diagnosis and management. One hour a week. Medical School.
- 469-70 *Child Guidance and Development* Jaeger-Lee, Lowne
Lectures to second year class. Clinically in fourth year including Well Baby Clinic. Group and class conferences.

PHARMACOLOGY

Paul Kenneth Smith, Ph.D., *Professor of Pharmacology Executive Officer*

Ralph Gratton Smith, M.D., Ph.D., *Adjunct Clinical Professor of Pharmacology*

Bernard Beryl Brodie, Ph.D., *Professorial Lecturer in Pharmacology*

Harold George Mundel, Ph.D., *Associate Professor of Pharmacology*

Clarke Davison, Ph.D., *Assistant Professor of Pharmacology*

Glenn Albert Fischer, Ph.D., *Assistant Research Professor of Pharmacology*

Moreshwar Vishal Nadkarni, Ph.D., *Assistant Research Professor of Pharmacology*

Joyce Barbara Brous, Ph.D., *Assistant Research Professor of Pharmacology*

Charlotte Hess Knox, A.M., *Research Fellow in Chemotherapy*

Helen Chiang Ying Yen, M.S., *Research Fellow in Pharmacology*

Elise Ann Brandenburger Brown, M.S., *Research Fellow in Pharmacology*

Edwin Ira Goldenthal, M.S., *Research Fellow in Pharmacology*

William Daniel Kandin, M.S., *Research Fellow in Chemotherapy*

Richard Anthony Salvador, A.M., *Teaching Fellow in Pharmacology*

Nicholas Michael Cambosos, B.S., *Research Fellow in Pharmacology*

Gertrude Patricia Quinn, M.S., *Teaching Fellow in Pharmacology*

261 *Pharmacology* (5)

Learning and understanding concerning the interaction of drugs and biological systems as a basis for the rational therapy of disease. Open to qualified non-medical students. Five lectures a week.

The Staff

262 *Pharmacology* (1)

Continuation of Pharmacology 261. One hour a week.

The Staff

263 *Pharmacology Laboratory* (1)

Laboratory instruction and demonstration designed to complement Pharmacology 261. Open to qualified non-medical students. Three hours a week.

The Staff

265 *Chemotherapy* (1)

Five lectures a week for three weeks. For graduate students. Time to be arranged.

The Staff

267-268 *Pharmaceutical Research* (arr.)

Preliminary to those properly qualified graduate and medical students seeking careers in pharmacology. Hours and credits to be arranged.

The Staff

(So)

269-70 *Pharmacology Seminar* (1-1)

Recent advances in pharmacology. For those interested in pharmacological research. Open to qualified nonmedical students. Two hours a week.

The Staff

280 *Special Methods in Research* (arr.)

A course to familiarize the student with advanced chemical and physiological methods employed in pharmacological investigations. Open to qualified nonmedical students. Hours and credits to be arranged.

The Staff

299-300 *Thesis* (3-3)

Required of Master of Arts and Master of Science candidates.

The Staff

339-40 *Therapeutic*

Conferences I

Staff of Pharmacology and Medicine

Conferences designed to emphasize the application of pharmacological principles to the problems of clinical medicine. One hour a week.

PHYSICAL MEDICINE AND REHABILITATION

Charles Samuel Wise, B.S., M.D., *Professor of Physical Medicine and Rehabilitation, Executive Officer*

Josephine Jordan Buchanan, A.M., M.D., *Assistant Clinical Professor of Physical Medicine and Rehabilitation*

Alvin Knudson, B.S., M.D., *Associate in Physical Medicine and Rehabilitation*

Jasper Wayne McFarland, B.S., M.D., *Clinical Instructor in Physical Medicine and Rehabilitation*

Helen Eileen Weber, B.S., R.P.T., R.N., *Assistant in Physical Medicine and Rehabilitation*

Francis Liell Wenger, B.S., M.D., *Fellow in Physical Medicine and Rehabilitation*

Jessie Elizabeth Fair, M.C.S.P., R.P.T., *Assistant in Physical Medicine and Rehabilitation*

Richard Roberts Owen, B.S., M.D., *Fellow in Physical Medicine and Rehabilitation*

15 *Elements of Physical Medicine*

The Staff
In arrangement with the Anatomy Department, lectures and demonstrations of the various tests and measurements are employed in the recognition of physical disability. Emphasis is placed on normal and abnormal peripheral nerve testing, electrodiagnosis, muscle testing, joint pulse, and other physical disability measurements.

351-352 *Advanced Physical Medicine*

The Staff
Lectures and demonstrations concerning the various techniques, clinical applications of physical medicine and rehabilitation to be arranged with the teaching of the associated medical and surgical specialties.

457-458 *Clinical Studies*

The Staff
Clinical teaching and demonstration at the University Hospital.

485 *Research (arr.)*

The Staff
Open to medical students and qualified nonmedical students. Time and credits to be arranged.

PHYSIOLOGY

- Errett Cyril Albritton, A.B., M.D., *Fry Professor of Physiology*
 Chester Elwood Leese, Ph.D., *Professor of Physiology, Executive Officer*
 Joseph William Still, M.D., M.P.H., *Assistant Professor of Physiology*
 Melvin Harold Heffer, Ph.D., *Assistant Research Professor of Physiology*
 Habeeb Bacchus, Ph.D., M.D., *Assistant Research Professor of Physiology*
 Hyman Erwin Steinman, M.D., *Lecturer in Physiology*
 Charles Arthur Toompas, A.M., *Instructor in Physiology*
 Louis Pat Munan, M.S., *Associate in Physiology*
 William Spector, A.M., *Associate in Physiology*
 Francis DeSales Woidich, B.S., M.D., *Associate (Research) in Physiology*
 Katherine Virginia Greene, Ph.D., *Teaching Fellow in Physiology*
 Tal Gordon Hiebert, A.M., *Teaching Fellow in Physiology*

- 115 *Physiology (3)* Leese
 Lectures for nonmedical students covering the fundamentals of physiology in its various subdivisions. Prerequisite: one year of general science or the term of a baccalaureate degree. Section A: First and Third, 8:45 to 10:15 A.M.; section B: Two and Fourth, 2:30 to 4:25 P.M.
- 117 *Experimental Physiology (1)* Greene and Still
 Laboratory exercises in the fundamentals of physiology, for nonmedical students. Prerequisite: or equivalent registration. Physiology 115 or the equivalent. Manual fee, \$15. Secs. 2, 10 to 12 A.M.
- 126 *Physiology of Excretory Activity (2)* Albritton, Munan
 For nonmedical students. The excretory, circulatory, reproductive, growth, and other activities, immediate and long term, involving and affecting excretory activity. Prerequisite: Physiology 115 or the equivalent. Two and Fourth, 8:10 A.M.
- 130 *The Psychophysiology of Personality (2)* Leese
 For nonmedical students. Lectures on the stress and expression of personality, with emphasis on the physiological approach. Prerequisite: Physiology 115 or the equivalent and general psychology. Two and Fourth, 8:10 A.M.
- 150 *Advanced Physiology* The Staff
 One limited twenty-five physiological theories and one limited twenty-five laboratory course devoted to the major divisions of the subject. For medical students.
- 201-2 *Experimental Method (1-1)* Albritton
 For nonmedical graduate students. Design of controlled experiments in medical or biological investigation; errors in design, technique and

judgment of evidence; and tests of the statistical significance of experimental results. Sat., 9:00 A.M.

Physiology 2013, same as 201, offered spring term.

211-12 *Problems in Physiology* (att.)

The Staff

For nonmedical graduate students. Open to undergraduate students with the approval of the Department. Prerequisites: Physiology 115 and 117, or the equivalent. Time and credits to be arranged.

221-22 *Physiology Seminar* (1-1)

The Staff

For nonmedical students undertaking graduate work in physiology. Prerequisites: Physiology 115 and 117, or the equivalent. Weekly throughout the year.

231 *Advanced Physiology of*

Albritton, Leese, and Staff

Circulation and Respiration (4)

For nonmedical graduate students. Lectures on blood, heart, circulation, tissue water, respiration, and acid-base balance. Four hours a week, to be arranged.

234 *Advanced Physiology of Nutri-*

Leese, Still, Steinman

tion, Metabolism, and Excretion (2)

For nonmedical graduate students. Lectures on nutrition, digestion, metabolism, excretion, and temperature regulation. Two hours a week, to be arranged.

240 *Advanced Physiology of the Endo-*

Albritton, Still,

crine Glands and Reproduction (1)

and Staff

For nonmedical graduate students. Lectures on ductless glands, hormones, hormonal agents, and reproduction. One hour a week, to be arranged.

248 *Advanced Physiology of the Nervous-Muscular*

Leese

System (2)

For nonmedical graduate students. Lectures on sensory reception, central nervous processes, kinetic and visceral motor activity, and the influence of sensory and effector muscles. Two hours a week, to be arranged.

240 *Advanced Experimental Physiology* (3)

The Staff

For nonmedical graduate students. Laboratory work only. Coordinated with the lectures in courses 211-248. Material fee, \$10. Nine hours a week, to be arranged.

295-96 *Research* (att.)

Albritton, Leese, and Staff

Material fee, \$12 a credit hour. Time and credits to be arranged.

297-300 *Thesis* (3-3)

Albritton, Leese

PSYCHIATRY

- Winifred Overholser, A.B., M.D., Sc.D., *Professor of Psychiatry, Executive Officer*
- Solomon Katzenelbogen, M.D., *Clinical Professor of Psychiatry*
- Addison McGuire Duval, M.D., *Clinical Professor of Psychiatry*
- Leon Yochelson, A.B., M.D., *Associate Clinical Professor of Psychiatry*
- Sidney Berman, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Morris Kleimermann, Ch.D., M.B., *Assistant Clinical Professor of Psychiatry*
- Henry Prather Laughlin, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Marshall de Graffenried Rutlin, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Jay Louis Hoffman, A.B., M.D., *Assistant Clinical Professor of Psychiatry*
- Elmer Klein, B.S., M.D., *Assistant Clinical Professor of Psychiatry*
- Anna Coyne Todd, A.B., M.D., *Assistant Clinical Professor of Psychiatry*
- Norman Taub, B.S., M.D., *Associate in Psychiatry*
- Harold Corson, M.D., *Associate in Psychiatry*
- Anna Genevieve McElowney, A.B., M.D., *Associate in Psychiatry*
- Sarah Slatoff Tenenblatt, A.B., M.D., *Associate in Psychiatry*
- Helen Pallister, Ph.D., *Clinical Instructor in Psychiatry (Psychology)*
- David Eden, A.B., M.D., *Clinical Instructor in Psychiatry*
- Clarence Bunge, B.S., M.D., *Clinical Instructor in Psychiatry*
- Robert Milton Greenberg, A.B., M.D., *Clinical Instructor in Psychiatry*
- Richard Allan Rogers, B.S., M.D., *Clinical Instructor in Psychiatry*
- Richard Graham Board, B.S., M.D., *Clinical Instructor in Psychiatry*
- Mottram Peter Torre, M.D., *Clinical Instructor in Psychiatry*

165 *Dynamics of Personality Development*

Berman

An excellent course in the scientific, physiological, and psychological aspects of the development of personality. Consideration of the characteristics of various types, and development of the individual from the normal to the pathological. One hour a week.

178 *Psychopathology*

Hoffman

Masterly and understanding of various mental modalities and abnormal reaction types, provided by history of development of psychopathology and illustrated with case material. One hour a week.

- 266 *Psychiatry* Overholser
History, etiology, symptoms, course, and treatment of the major psychoses with emphasis on the symptoms involving the mind as a whole. One hour a week.
- 268 *Demonstration Clinics* McElowney, Tenenblatt
Presentation of clinical cases of major mental illnesses and primary behavior disturbances correlating with Psychiatry 266. Each student examines patients under supervision. Three hours a week. St. Elizabeths Hospital.
- 271 *Psychosomatic Aspects of General Medicine* Katzenelbogen
Somatic disorders of psychogenic origin. The role of personality factors in functional and organic disorders. One hour a week.
- 324 *Psychoneurology* Lavach
Etiology, psychopathology, clinical aspects, and treatment of various types of psychoneuroses. One hour a week. Medical Conference Room, D. C. General Hospital.
- 431-32 *Clinical Clerkship* Duval, Kleinerman, Yochelson, Ruffin, Traub, Corson, Reiser, Pallister, Eden, Bunge, Greenberg
Supervised examination, diagnosis, and treatment of ambulatory and hospitalized cases in University Hospital and St. Elizabeths Hospital. Conferences for discussion of cases. Clinical application of psychiatric principles to general medical practice is stressed. Three weeks divided service. University Hospital, Outpatient and Outpatient Psychiatric Clinics and St. Elizabeths Hospital.

RADIOLOGY

William Woodrow Stanbro, M.D., *Professor of Radiology, Executive Officer*

Solomon Rodney Bersack, B.S., M.D., *Assistant Clinical Professor of Radiology*

Ludwig Carl Krouth, A.B., M.D., *Assistant Clinical Professor of Radiology*

Charlotte Patricia Donlan, A.B., M.D., *Assistant Clinical Professor of Radiology*

Alvin Charles Wyman, A.B., M.D., *Associate in Radiology*

George Tievsky, M.D., *Clinical Instructor in Radiology*

Uthai Vincent Wilcox II, M.D., *Clinical Instructor in Radiology*

115-16 *Anatomy*

Correlation of gross and Roentgen anatomy

The Staff

226 *Principles of Radiology*

Lectures and discussion

The Staff

313 *Advanced Radiological Diagnosis*

Lectures and discussion

The Staff

421-22 *Clinical Studies*

Students are assigned to the X-ray Department in rotation on a full-time basis for a specific period

The Staff

SURGERY

- Brian Blades, A.B., M.D., *Professor of Surgery, Executive Officer*
 Paul Stirling Putzki, M.D., *Clinical Professor of Surgery*
 Arch Lockhart Riddick, B.S., M.D., *Clinical Professor of Surgery*
 John Hugh Lyons, M.D., M.S., *Clinical Professor of Surgery*
 John Gordon Lee, A.B., M.D., C.M., Med. Sc.D. (Surgery), *Adjunct Clinical Professor of Surgery*
 Robert Tuthill Ganta, B.S., M.D., *Adjunct Clinical Professor of Surgery*
 Herbert Hermann Schoenfeld, M.D., *Associate Clinical Professor of Surgery*
 Alec Horwitz, M.S., M.D., *Associate Clinical Professor of Surgery*
 William Stanley McCune, A.B., M.D., *Associate Clinical Professor of Surgery*
 Walter Henry Gerwig, Jr., A.B., M.D., *Associate Clinical Professor of Surgery*
 Vincent Michael Iovine, B.S., M.D., *Associate Clinical Professor of Surgery*
 Owen Gwathmey, A.B., M.D., *Assistant Professor of Surgery*
 Benjamin Franklin Dean, Jr., M.S., M.D., *Assistant Clinical Professor of Surgery*
 Carl Berg, M.D., *Assistant Clinical Professor of Orthopedic Surgery*
 Calvin Trexler Klopp, A.B., M.D., *Assistant Clinical Professor of Surgery*
 Julius Salem Neviasser, A.B., M.D., *Assistant Clinical Professor of Orthopedic Surgery*
 Jerome Blaine Hatrell, M.D., *Assistant Clinical Professor of Surgery*
 Leonard Theodore Peterson, B.S., M.D., *Assistant Clinical Professor of Orthopedic Surgery*
 John Petch Adams, B.S., M.D., *Assistant Clinical Professor of Orthopedic Surgery*
 Richard Knight Thompson, D.D.S., *Associate in Dental Surgery*
 William Ross Morris, M.D., *Associate in Surgery*
 Louis Joseph Weinstein, B.S., Phar.G., M.D., *Associate in Surgery*
 William Carey Meley, M.D., M.S. in Med., *Associate in Surgery*
 Edward Alexander Cafritz, M.D., *Associate in Surgery*
 Gordon Sparks Letterman, B.S., M.D., *Associate in Surgery*
 Karl Hayden Wood, Phar.G., D.D.S., *Associate in Dental Surgery*
 Isabella Harrison, A.B., M.D., *Associate in Surgery*
 Paul Charles Adkins, A.B., M.D., *Instructor in Surgery*

- Crenshaw Douglas Briggs, B.S., M.D., *Clinical Instructor in Surgery*
 Joseph Francis Conlon, D.D.S., *Clinical Instructor in Dental Surgery*
 Diane Case Richmond, A.B., M.D., *Clinical Instructor in Surgery*
 Leon Gerber, M.D., *Clinical Instructor in Surgery*
 Thomas Bradley, A.B., M.D., *Clinical Instructor in Surgery*
 Ernest Alva Gould, B.S., M.D., *Clinical Instructor in Surgery*
 Austin Bertram Rohrbaugh, Jr., M.D., *Clinical Instructor in Orthopedic Surgery*
 Marvin Hayne Kendrick, A.B., M.D., *Clinical Instructor in Surgery*
 Brooks Gideon Brown, B.S., M.D., *Clinical Instructor in Surgery*
 Lois Irene Platt, A.B., M.D., *Clinical Instructor in Surgery (Cancer Cytology)*
 John Deaton Hoyle, B.S., M.D., *Clinical Instructor in Surgery*
 Henry Leon Fetter, A.B., M.D., *Clinical Instructor in Orthopedic Surgery*
 Robert Roland Smith, B.S., M.D., *Clinical Instructor in Surgery*
 Howard Clemeth Pierpont, A.B., M.D., *Clinical Instructor in Surgery*
 Norman Harry Isaacson, A.B., M.D., *Clinical Instructor in Surgery*
 Charles Stanley White, Jr., B.S., M.D., *Clinical Instructor in Surgery*
 Dennis Parmenter McCarty, M.D., *Clinical Instructor in Surgery*
 James Richard Thistlethwaite, B.S., M.D., *Clinical Instructor in Surgery*
 Marvin Leon Kolkun, M.D., *Fellow in Plastic Surgery*
 Sung Haing Lee, M.D., *Fellow in Thoracic Surgery*
- 121-2 *Surgical Anatomy* Surgery and Anatomy Staffs
 Cases illustrating relationship between gross anatomy and clinical surgery. One hour every two weeks. University Hospital.
- 280 *Introduction to Surgery* The Staff
 Lectures and exercises covering the field of general surgery. Also one hour a week.
- 284 *Surgical Physiology* The Staff
 A clinical and laboratory course with particular emphasis on applied physiology. Two hours a week.
- 373-74 *Clinical Clerkship I* The Staff
 The student is rotated and assigned to work on clinically the cases for diagnosis and treatment. D. C. General Hospital.
- 375-76 *Outpatient Surgical Clinic* The Staff
 Surgical cases. Postgraduate. D. C. General Hospital.
- 377-78 *Orthopedics I* The Staff
 Weekly orthopedic lecture, D. C. General Hospital; weekly seminar and one-hour hour ward rounds, D. C. General Hospital.
- 379-80 *Surgical Staff Conference I* The Staff
 Tuesday at D. C. General Hospital.

- 383-84 *Surgical Clinic I* Blades
Demonstration of various surgical diseases to the entire class. One hour a week.
- 473-74 *Clinical Clerkships II* The Staff
Six weeks, University Hospital, three weeks, Mt. Alto Hospital.
- 479-80 *Surgical Staff Conference II* The Staff
Wednesday at the University Hospital
- 483-84 *Surgical Ward Rounds* Blades
Demonstration of various surgical diseases to fourth-year clerks. One hour a week. University Hospital.
- 491-92 *Surgical Pathology II* Newman
One hour conferences each week
- 493-94 *Surgical Anatomy* Horwitz and Staff
Lectures for fourth-year clerks. One hour a week for twelve weeks. University Hospital
- 497-98 *Surgical Clinic* Blades and Staff
Conferences for fourth-year clerks assigned to the University Hospital. Two hours a week. Walter Reed Hospital

UROLOGY

Frederick A. Reuter, M.D., *Professor of Urology, Executive Officer*
 Thomas Carlton Thompson, B.S., M.D., *Clinical Professor of Urology*
 Edward Egner Ferguson, M.D., *Assistant Clinical Professor of Urology*
 Gilbert Ottenberg, A.M., M.D., *Associate in Urology*
 William Dabney Jarman, B.S., M.D., *Associate in Urology*
 Leon Richard Culbertson, B.S., M.D., *Associate in Urology*
 Gordon Rhodes MacDonald, B.S., M.D., *Clinical Instructor in Urology*
 Herbert DeGrange Wolff, Jr., M.D., *Clinical Instructor in Urology*
 Frederick Turner Reuter, M.D., *Clinical Instructor in Urology*
 Hamilton Peacock Dorman, B.S., M.D., *Clinical Instructor in Urology*

395-96 *Clinics*

The Staff
 Clinical teaching and demonstrations on the care of urological cases
 with special emphasis on the pre- and post-operative management.
 Operative clinics and clinical teaching. D. C. General Hospital.

491-92 *Urology*

F. A. Reuter and Staff
 Lectures covering the entire field of urology including diagnosis, treat-
 ment, and morbid pathology. One hour a week.

495-96 *Clinics*

F. A. Reuter and Staff
 Clinical demonstrations, teaching in the Outpatient Department and
 general X-ray department with special attention given to diagnostic
 procedures. One part of each section three hours a week. Univer-
 sity Hospital.

DOCTOR OF MEDICINE

44

Harold Franklin Albert	Pa	John Francis Galtis	
B.S. 1941, Mount St. Bernard College		A.B. 1944, Fairleigh Dickinson	
Edward Carl Applegate	Conn	B.S. 1941, University of Missouri	Mo
A.B. 1941, University of California		David Albert Atkinson	
Robert Murray Armstrong	Iowa	A.B. 1941, The George Washington University	Wa
B.S. 1941, University of Idaho		Lawrence J. Babin	
Harold Bauman	Mo	Lawrence William Babin, Jr.	Conn
B.S. 1941, Howard University		A.B. 1941, University of Wisconsin	
M.S. 1942, Ph.D. 1945, The George Washington University		Constance M. Baker	
Robert Benjamin	Wa	(With dissertation)	
(With dissertation)		A.B. 1942, Yale University	Co
B.S. 1941, University of Wisconsin		John Robert Baker	Wa
Edmund Brown Bice	Pa	A.B. 1941, Johns Hopkins University	
(With dissertation)		Robert William Bickman	Mo
A.B. 1941, The George Washington University		(With dissertation)	
Joseph Brown		Harold Brown, Jr.	Mo
B.S. 1941, Miami University	R.I	A.B. 1941, Pennsylvania State University	Pa
Frederick C. Brown, Jr.	Wa	Richard Elmer Brown	Mo
B.S. 1940, University of Wisconsin		Marion Scott Brown	
Archie Taylor Brown	Conn	William Melvin Brown, Jr.	Pa
A.B. 1941, Howard University		A.B. 1941, University of Illinois	
Muriel Alexander Buehl	Wash	Frank Brown, Jr.	
B.S. 1941, Washington State College		A.B. 1941, University of Maryland	
James Graham Bunker	Va	Michael Zdzislaw Busk	Co
A.B. 1941, Johns Hopkins University		From a German name	
Christopher C. Butcher	Conn	(With dissertation)	
B.S. 1941, Wayne State University		A.B. 1941, University of California	Ca
Harry Nelson Butts	Mo	Norman C. Butler	
B.S. 1941, The George Washington University		(With dissertation)	
John William Cady	Pa	Muriel C. Butler	Pa
A.B. 1941, California University of Science		Harold Albert Butts	Pa
Muriel Cady		A.B. 1941, University of Illinois	
The George Washington University		A.M. 1941, University of Illinois	
Frederick Eugene	Pa	Frederick Henry Butts	
A.B. 1941, The George Washington University		B.S. 1941, Ohio College	
Robert Edmund Chaffee	Pa	Lawrence Lee Cady	Pa
Robert Avery Chaffee		B.S. 1941, Washington College	
B.S. 1941, University of Illinois		Marion Cady Cady	
Michael Thomas Chaffee	Conn	(With dissertation)	
B.S. 1941, Kentucky University		Harold Albert Cady	
Muriel Cady		(With dissertation)	
The George Washington University		Robert Cady	
Stephen William Chaffee	Mo	William Frank Chaffee, Jr.	Mo
(With dissertation)		A.B. 1941, Howard University	
A.B. 1941, Xavier University	N.J.	John Cady Chaffee	N.J.
Edward W. Chaffee		(With dissertation)	
(With dissertation)		John William Chaffee, Jr.	Pa
A.B. 1941, Howard University		A.B. 1941, University of California	
Frederick Chaffee	Mo	Robert C. Chaffee	
Archie Chaffee	Pa	A.B. 1941, University of Wisconsin	
A.B. 1941, A.M. 1945, The George Washington University		John Cady Chaffee	Pa
Paul Lawrence Chaffee	Conn	William Chaffee	
B.S. 1941, Western Reserve University		(With dissertation)	
Stephen Chaffee	Mo	Robert C. Chaffee	
B.S. 1941, University of Maryland		John Cady Chaffee	Pa
B.S. 1941, University of Maryland			

STUDENTS REGISTERED IN THE SCHOOL OF MEDICINE

1954-55

A			
Aaranson, Charles Martin (IV)	D.C.	Bennett, Stuart Paul (II)	N.Y.
A.B. 1952, The George Washington University		A.B. 1941, New York University	Ma
Alarcon, Odette (II)	Guatemala	Blaugwell, Florence Fisher (III)	W.
A.B. 1953, Wesley College		B.S. 1944, Bennett College	
Allen, Bernard Linn (I)	N.J.	Bowen, Donald Richard (II)	D.C.
B.S. 1954, Franklin and Marshall College		A.B. 1944, Wesley College	D.C.
Allen, May Henry (I)	Va	Brown, George Arnold (II)	
B.S. 1951, The George Washington University		B.S. 1951, Franklin and Marshall College	Calif.
Anderson, Ernest Christian (II)	Calif.	Brown, Robert (III)	Ma
A.B. 1951, San Jose State College		A.B. 1941, Stanford University	Fla
Anderson, Donald Norman (IV)	Ohio	Brown, Charles Leonard (III)	D.C.
A.B. 1950, Yale University		A.B. 1952, Lafayette College	
Anderson, William Bruce (II)	Oreg.	Brown, Robert Simpson (I)	
A.B. 1950, Stanford University		A.B. 1944, The George Washington University	Ma
Andrews, Vernon Marie (I)	D.C.	Brown, Rogers Klara (II)	Wa
B.S. 1951, Wayne Teachers College		Brown, John William (I)	
Applegate, William Vain (II)	Calif.	Brown, David John (II)	Idaho
A.B. 1951, University of California		A.B. 1941, Case Western Reserve	Calif.
Arner, Ronald Alan (I)	Pa	Burgoyne, Rodney William (II)	
Arner, John Allen (II)	Va	Burns, Lafayette Ernest (IV)	Ma
A.B. 1949, The George Washington University		B.S. 1951, University of California	
Austin, Jack (III)	D.C.	Burns, Robert Jr. (IV)	
Austin, James Albert (III)	Ariz.	B.S. 1951, Franklin and Marshall College	Calif.
A.B. 1951, University of Southern California		Burns, Seymour (II)	
		B.S. 1954, M.S. 1955, The George Washington University	
B		C	
Baker, Gordon (IV)	N.J.	Calvert, Francis Nelson (IV)	Va
Baker, Vernon Henry (II)	D.C.	A.B. 1949, Howard College	Calif.
A.B. 1947, Concordia Theological Seminary		Campton, John David III (I)	
Barfield, William Landon (I)	Ma	A.B. 1954, University of California at San Marcos	N.Y.
A.B. 1954, Princeton University		Carter, Jerome Wolf (IV)	Ma
Barling, Bruce Cramer (III)	Ma	Carter, Jim Russell (IV)	D.C.
B.S. 1952, Georgetown University		Casson, Paul Earle (III)	Calif.
Barr, Jack Lee (III)	Ohio	A.B. 1951, Stanford University	
Barran, Frank Thomas (III)	Ma	Carr, Lawrence Raymond (II)	D.C.
A.B. 1952, Duke University		A.B. 1951, Stanford University	
Barnett, John William (I)	Pa	Carter, Thomas Nelson (IV)	N.Y.
Barnett, John Newman (I)	Ohio	B.S. 1951, American University	
B.S. 1951, Western Reserve University		Cery, Matthew John (I)	Wash
Barlow, Richard Albert (IV)	D.C.	B.S. 1954, Johns Hopkins University	Pa
A.B. 1951, University of California		Chapman, John Thomas (IV)	Pa
Bauer, George Wendell, Jr. (II)	Calif.	Chapman, William Alexander (IV)	
Bear, Robert Andrew (II)	Ma	Cherry, Allen (III)	
B.S. 1951, University of Maryland		A.B. 1954, Washington and Jefferson College	Va
Bear, Franklin David (IV)	Va		Ma
B.S. 1951, Duke University		Chinn, John John (II)	
Bell, John Lawrence, Jr. (II)	Calif.	Clark, George Reed (II)	Calif.
Bell, Charles Donald (IV)	Mont.	B.S. 1951, University of Maryland	
A.B. 1951, Montana State University		Clark, Thomas Charles (IV)	
Bell, Leonard (II)	N.Y.	A.B. 1954, The George Washington University	
B.S. 1951, Queens College			
Bergers, Donald James (I)	Utah		

[illegible]

Troslansky, Charles Hilary (I) A.B. 1964, The George Washington Univ. (I)	D.C.	Williams, Kathryn Anne (III) B.S. 1964, University of Pittsburgh	Pa.
Tsadirian, Nebyros Theodore (III) B.S. 1964, Duke University	Fla.	Williams, Robert Edwin (III) Winn, Henry Edward, Jr. (I)	D.C. Pa.
Tyler, George Scott (I) A.B. 1954, University of California	Calif.	W.S. 1954, George City College Winn, Jerome Patricia (I) B.S. 1964, The George Washington University	Va.
V		Wondol, William Landon (IV) B.S. 1964, Tufts University	Fla.
Van de Carr, Francis Rene (II) B.S. 1961, American University	Calif. Md.	Wondol, Joseph David (II) B.S. 1964, Swarthmore College	D.C.
Vogel, Jane Remondine (III) B.S. 1962, Middlebury College	Puerto Rico	Woods, Ronald Harlan, Jr. (II) Woy, Theodore Charles (I)	Va. Calif.
Von Rueden, Robert (II) B.S. 1961, American University	Norway		
Voss, Fred Kenneth (IV)	Ill.	Y	
W		Yakovlev, Gilbert Herbert (III) B.S. 1962, The College of the City of New York	D.C.
Walden, Morton Benjamin (I) A.B. 1964, Lafayette College	N.J.	Yee, James Fung Gung (I) Yeh, Paul Timothy (IV) B.S. 1966, Fresno's Maritime College	Calif. Ill. Calif.
Walden, Thomas MacGraw (I) A.B. 1964, Grinnell College	Calif.	Yeh, Victor Ching (IV) Yee, Joseph Peter (III)	Pa.
Walden, George (III) B.S. 1962, Iowa State College	N.Y.		
Walden, Louis Frederick, Jr. (II) Walden, Harold Herbert (II) B.S. 1961, Tufts College	Md. N.Y.	Z	
Walden, James H. (III) B.S. 1962, University of Massachusetts	Mass.	Zach, Robert Lloyd (II) B.S. 1961, Stanford University	Mo.
Walden, George Kenneth (II) Walden, Thomas MacGraw (I) Walden, Henry Wilson (IV) B.S. 1962, The George Washington University	Md. D.C. D.C.	Zach, Lawrence Irving (III) Zach, Richard Charles (II) B.S. 1961, The George Washington University	D.C. W.
Walden, John Daniel (III)	W.	Zach, Nicholas Louis (II) B.S. 1961, Georgetown University	D.C.

SUMMARIES OF REGISTRATION

1954-55

NUMBER OF REGISTRANTS

Class entering September 1954.....	102
Class entering September 1953.....	92
Class entering September 1952.....	85
Class entering September 1951.....	85
Total.....	364

GEOGRAPHICAL DISTRIBUTION OF STUDENTS

Alabama.....	1	New Mexico.....	2
Arizona.....	3	New York.....	2
California.....	44	North Carolina.....	1
Colorado.....	2	North Dakota.....	1
Connecticut.....	5	Ohio.....	1
Delaware.....	1	Oklahoma.....	1
District of Columbia.....	62	Oregon.....	13
Florida.....	7	Pennsylvania.....	13
Georgia.....	2	Utah.....	2
Idaho.....	6	Virginia.....	3
Illinois.....	9	Washington.....	7
Indiana.....	2	West Virginia.....	1
Iowa.....	1	Wisconsin.....	2
Kansas.....	2	Wyoming.....	1
Kentucky.....	2	China.....	1
Maine.....	2	Cuba.....	1
Maryland.....	30	Guatemala.....	1
Massachusetts.....	3	Hawaii.....	2
Michigan.....	5	India.....	1
Minnesota.....	1	Iran.....	1
Mississippi.....	2	Israel.....	4
Missouri.....	3	Norway.....	1
Nebraska.....	1	Puerto Rico.....	1
New Jersey.....	10		

GRADUATES OF COLLEGES REGISTERED IN THE SCHOOL OF MEDICINE

Albany University of.....	1	California Institute of Technology.....	1
American University.....	4	California University of.....	8
Amherst College.....	2	Columbia University of at Los Angeles.....	4
Arizona State College, Tempe.....	1	Colorado.....	2
Bates College.....	1	Connecticut College.....	1
Baylor College.....	1	Cornell College.....	1
Boston College.....	1	Carroll College.....	1
Bridgman Young University.....	2	Catholic University of America.....	1
Brigham Young University.....	1	Chicago University of.....	1
Brown University.....	1	Columbia University.....	1

Concordia Seminary			
Cornell University	2	Pacific Union College	1
Dartmouth College	1	Pennsylvania State University	2
Denver, University of	5	Philadelphia College of Pharmacy	
Duke University	1	and Science	1
Eastern Methodist College	13	Pennsylvania University of	4
Eastern Nazarene College	1	Polyscience Institute of Pacific	
Emory University	1	Rice	1
Florida University of	1	Pomona University	2
Franklin and Marshall College	1	Queens College	2
Georgetown University	7	Ryerson College	1
George Washington University	3	Rutgers College	1
Graceland College	47	Rutgers University	2
Graceland College	1	St. Francis College	1
Harvard University	5	St. Mary's College	1
Harvard College	4	San Diego State College	1
Hawaii University of	1	San Jose State College	1
Hawaii College	1	Sarasota, University of	1
Hawaii State College	2	Southern California University of	1
Idaho University of	1	Stanford University	7
Idaho University of	2	Southwest College	1
Indiana University	1	Saint Bonifacio College	1
Iowa State College	1	Syracuse University	5
Iowa State University	1	Taylor University	1
Lehigh University	1	Texas University of	4
Lehigh College	1	Tulsa College	4
Lehigh University	5	Utah University of	2
Los Angeles University of	1	Utah State Agricultural College	2
Massachusetts University of	1	Vanderbilt University	2
Massachusetts University of	1	Vermont University of	1
McGill University	8	Vermont College	1
Michigan University of	1	Vermont University of	2
Michigan State College	1	Wagner Memorial Lutheran Col-	
Michigan State Normal College	2	lege	1
Michigan University of	1	Wake Forest College	1
Michigan University of	1	Washington and Jefferson College	1
Michigan Valley College	1	Washington and Lee University	2
Minnesota State University	1	Washington University	1
Missouri State College	3	Washington University of	2
Missouri College	1	Washburn College	1
New England College of	1	Wells College	1
New York College of the City of	1	Western Maryland College	1
New York University	1	Western Reserve University	2
North Carolina University of	5	West Virginia University	2
North Dakota University of	1	Wisconsin College	1
Northwestern University	1	Wisconsin College	1
Ohio College	1	Wilson Teachers College	1
Ohio State University	3	Wisconsin University of	2
Ohio Wesleyan University	2	Yale University	1
Oklahoma City College	1	Yale College	1
Oklahoma University of	1		
Oregon State College	2		
	1		

Number of College Graduates 207
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 sent 115

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THE LAW SCHOOL

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CALENDAR

1955-56

Date	Day	Observation
1955		
FALL TERM		
Sept. 22-23	Thursday and Friday	Registration
Sept. 26	Monday	Fall term begins
Nov. 11	Friday	Fall Commencement Holiday
Nov. 24-26	Thursday through Saturday	Thanksgiving recess
Dec. 17-31	Monday through Saturday	Christmas recess
1956		
Jan. 2	Monday	Classes resume
Jan. 3	Tuesday	Last day for receiving doctoral theses of candidates for the de- gree of Doctor of Juris Science to be conferred the following June
Jan. 23-31	Monday through Thursday	Fall term examination period
SPRING TERM		
Feb. 2 and 3	Thursday and Friday	Registration
Feb. 6	Monday	Spring term begins
Feb. 22	Wednesday	Winter Commencement Holiday
March 30-April 4	Friday through Wednesday	Easter recess
May 21-27	Monday through Sunday	Spring term examination period
June 3	Sunday	Commencement
June 6	Wednesday	Commencement
SUMMER TERM*		

* Dates to be announced

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THE UNIVERSITY

HISTORY AND ORGANIZATION

The idea of a university in the Capital of the Nation was sponsored by George Washington, who during his public life urged the establishment of such an institution and who in his will left fifty shares of stock in the Potomac (Canal) Company for the endowment of a university to be established in the District of Columbia "to which the youth of fortune and talents from all parts thereof might be sent for the completion of their Education in all the branches of polite literature;—in arts and Sciences.—in acquiring knowledge in the principles of Politics & good Government".

The George Washington University operates under a charter granted by an act of Congress of February 9, 1821, to Columbian College in the District of Columbia. In 1873 the name was changed to "Columbian University" and in 1924 to "The George Washington University".

The University as it is now organized consists of the Junior College, comprising the work of the freshman and sophomore years; Columbian College, the senior college of liberal arts, which offers work leading to the Bachelor's and Master's degrees; the Graduate Council, which offers work leading to the degree of Doctor of Philosophy; the professional schools, which include Medicine, Law, Engineering, Pharmacy, Education, and Government; the College of General Studies; the Division of University Students; the Division of Special Students; the Division of Air Science; and the Summer Sessions.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association.

LOCATION

The George Washington University is in downtown Washington, four blocks west of the White House and east of the Potomac River with its extensive parkway. Within a few blocks are the buildings housing the offices of many of the departments of the Government, including the Department of State, the Department of the Treasury, the Department of Justice, the Department of the Interior, the Department of Agriculture, the Department of Commerce, and the Department of Labor. Also readily accessible are the Capitol, the Library of Congress, the National Archives, the Supreme Court, and other federal courts.

THE LAW SCHOOL

THE LAW SCHOOL

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GENERAL INFORMATION

LOCATION IN THE NATION'S CAPITAL

The George Washington University Law School, now in its 90th year, is the oldest law school in the District of Columbia. The School took part as a charter member in 1900 in the organization of the Association of American Law Schools and it has been an active member of the Association since that time. It is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association.

National University, which has had an important place in legal education in the District of Columbia since 1869, was merged into The George Washington University in August 1954.

Of special significance is the location of the Law School in the Nation's Capital, the focal point of the law in action, both American and international. The work of the School goes on in this environment presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. Readily accessible are the Supreme Court of the United States, the federal trial and appellate courts of the District of Columbia, and, in addition, federal courts of special jurisdiction, such as the United States Court of Claims, the United States Court of Customs and Patent Appeals, and the Tax Court of the United States. Current federal legislation can be studied as it is considered by Congressional committees and as it comes up for debate on the floor of the House of Representatives and the Senate. It is with respect to the federal administrative agencies that the students here in Washington have matchless opportunities for study and observation. They can attend informal and formal hearings of these agencies and can obtain from the docket sections complete records of administrative adjudication in specific cases. Illustrative of such federal agencies are the Interstate Commerce Commission and the Civil Aeronautics Board in the field of transportation; the Federal Trade Commission in the field of trade regulation; the Securities and Exchange Commission in the

field of security issues and corporate finance; the National Labor Relations Board in the field of labor-management relations; the United States Patent Office in the field of patent law; the Federal Power Commission in the field of water, natural gas, and electric power; and the Federal Communications Commission in the field of radio and television.

Supplementing these environmental advantages of law in action are the exceptional research library collections in the Library of Congress, in the various departments of the Federal Government, and in the libraries of the headquarters of national and international organizations located in Washington. The notable library of the Carnegie Foundation for International Peace has been acquired by The George Washington University for use of research students in international and comparative law, fields with respect to which Washington has come to be called "The Capital of the World".

The years of residence at law school are years of participation in the life of the community, which in the case of the George Washington University Law School, is the government of the United States by law. As a consequence, the study of law takes on added meaning, whether the goal be government service or practice, general or specialized.

OBJECTIVES

The primary purpose of the Law School is to prepare men and women to meet the needs of society in the many fields of law, public and private. These needs call not only for technical skill but also for responsible leadership in the development of the law and the administration of justice. In fulfilling these responsibilities the Law School offers: (1) a program of study in preparation for the practice of law; (2) programs of study and research on the graduate level for foreign students as well as for American; (3) a continuing legal education program for members of the bar; (4) institutes and forums on current topics in domestic and foreign law; (5) the publication of a law journal containing the results of research in public law; and (6) the encouragement of student professional co-curricular activities.

PROGRAMS OF STUDY

Traditionally the Law School has been national in the geographic distribution of its students. At the present time, men and women holding baccalaureate degrees from more than three hundred colleges and universities come from the forty-eight states, the territories, and several foreign countries to comprise the student body. As a consequence the programs of study leading to the degrees of Bachelor of Laws and Juris Doctor have been planned to provide instruction and training for the practice of law wherever the Anglo-American legal system obtains.

Graduate work leading to the degrees of Master of Laws and Doctor of Juridical Science is offered for those desiring further study and research in specialized fields of law.

Provision is made for advanced study by members of the bar who do not desire to register as candidates for degrees. Lawyers may take courses for this purpose either as unclassified graduate students or as continuing legal education students.

Graduate work is offered also to meet the needs of lawyers who come from countries whose legal systems are not based on the English law. There are two programs of study, one leading to the degree of Master of Comparative Law for lawyers planning to return to their own countries, and the other leading to the degree of Master of Comparative Law (American Practice) for lawyers planning to remain in this country for the practice of law.

FALL, SPRING, AND SUMMER TERMS

There are three terms: fall, spring, and summer. Students may enter the Law School at the beginning of any of the three terms. The academic year consists of the fall and spring terms.

MORNING AND EVENING DIVISIONS

The School maintains an evening division. The evening division conforms to the standards of the morning division and has the same teaching staff.

HOURS OF INSTRUCTION

Morning sections: Monday through Friday, 9:10 A.M. to 1:00 P.M.
Trial Practice Court: Saturday, 9:30 to 11:30 A.M.
Evening sections: Monday through Friday, 5:50 to 7:40 P.M.

THE LIBRARY

The Law Library of 48,000 volumes contains the official reports of the decisions of the courts of last resort of all states prior to the National Reporter System, and of some states complete to date; the National Reporter System, complete; the reports of the United States Supreme Court and lower federal courts, and the reports of federal administrative agencies; Shepard's Citations for the units of the Reporter System; the English Reports, Full Reprint; the English Law Reports; the Times Law Reports; the Dominion Law Reports; the United States statutes and codes; complete sets of statutes of all the states; the English statutes; the principal English and American digests and encyclopedias;

collections of special reports and annotated cases; United Nations documents; leading textbooks and treatises; and practically complete sets of about 150 legal periodicals. A section of the library, consisting of books acquired from National University, is known as the National University Law Collection.

The international law collection, formerly the library of the Carnegie Endowment for International Peace, is available to law students.

The Library, which is on the fourth floor of Stockton Hall, is open from 9:00 A.M. to 10:00 P.M., Monday through Friday; from 9:00 A.M. to 5:00 P.M. on Saturday; and from 2:00 to 6:00 P.M. on Sunday. Books and other materials do not circulate and must be used in the library.

THE LAW REVIEW

The George Washington Law Review, published by the University, is edited and managed by students of the Law School under the supervision of faculty advisers. It is devoted exclusively to state and federal public law. The location of the University in the National Capital, where the primary sources of federal public law may be observed in operation, affords an unexcelled opportunity for specialization in this field.

The *Review* organization includes a faculty editor-in-chief, an associate faculty editor, a faculty board of advisory editors, a board of departmental advisory editors, and a board of student editors. The student editors are chosen each year on the basis of scholarship.

THE STUDENT BAR ASSOCIATION

Every student in the Law School is a member of the Student Bar Association, which is organized to enable students to become better acquainted with problems of the profession, to foster professional ideals, and to bring about closer contact with members of the profession engaged in active practice of the law.

The work of the Student Bar Association is carried on by various committees and by group and general meetings of a professional and social nature. From time to time lectures are given by outstanding authorities on legal and professional problems.

An important activity is the Van Vleck Case Club Competition, which provides an opportunity for training in appellate advocacy. First and second year students participate as contestants before courts composed of members of the Faculty and the local bar. Senior law students of the Case Club also sit as judges. The final argument is held before a court composed of distinguished federal judges.

ORDER OF THE COIT

The Order of the Coit, a national honor society with chapters in over forty law schools, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University Chapter was established in 1926. Members are elected each year from the highest-ranking 10 per cent of the graduating class of the Law School.

ADMISSION

APPLICATION FOR ADMISSION

The Law School, as other colleges, schools, and divisions of the University, except the Division of Air Science, is coeducational.

An applicant for admission must obtain from the Office of the Director of Admissions of the University an application blank which he must fill out completely and return with the application fee of \$3.

Two recent photographs with the applicant's signature must accompany the blank.

To insure prompt action, applications should be filed not later than August 1 for the fall term, January 1 for the spring term, and May 1 for the summer term.

Requirements concerning records of higher institutions previously attended are set forth on the sheet attached to the application blank.

Attendance at classes is limited to students registered for credit. "Auditing" classes is not permitted.

REQUIREMENTS FOR ADMISSION

For the Degrees of Bachelor of Laws and Juris Doctor

Bachelor of Laws.—A Bachelor of Arts or equivalent degree awarded upon completion of a four-year course in an approved college or university is required. All pre-legal work must be of a satisfactory quality and distribution. No student will be admitted who has been in attendance at another law school and who is ineligible to return to that school in good standing. From the applicants, a selection will be made by the Committee on Admissions.

Juris Doctor.—A student does not register as a candidate for this degree until his last year in the Law School. For details, see page 28.

ADVANCED STANDING

Advanced standing toward the degree of Bachelor of Laws will be granted only for work successfully completed in other law schools which are members of the Association of American Law Schools.

Advanced standing will not be granted for law work already counted toward the Bachelor of Arts or other pre-legal degree.

Advanced standing toward the degree of Juris Doctor will not be granted.

For the Graduate Degrees

Candidates for graduate degrees must be accepted by the Committee on Graduate Studies.

*Master of Laws.**—A Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree from a member school of the Association of American Law Schools are required. Candidates for admission must have attained an average grade on all work done for the Bachelor of Laws degree equivalent to the relative position of a B average in the standards of grading at this Law School, except that, at the discretion of the Committee on Graduate Studies, applicants otherwise eligible may be admitted on proof of superior legal attainment as an alternative. Advanced standing will not be granted for credits earned while a candidate for the first degree in law.

Master of Comparative Law and Master of Comparative Law American Practice.—The following are required: (1) the successful completion of and graduation from a course in arts, philosophy, letters, or sciences, equivalent to graduation from a gymnasium, lycee, or liceo; and (2) graduation in law from a recognized foreign university where training was in Civil Law.

Doctor of Juridical Science. The following are required: a Bachelor of Arts or equivalent degree from an approved college or university and a Bachelor of Laws or equivalent degree, earned with high rank, from a member school of the Association of American Law Schools, and outstanding capacity for scholarly work in the field of law.

Unclassified Students

A person who is in good standing as a degree candidate in another law school which is a member of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student in order to earn credits for transfer to the other law school.

A person who is a member of the bar or a person, not a member of the bar, who is a graduate of a member school of the Association of American Law Schools may, at the discretion of the Dean, be admitted as an unclassified student.

*Required the work necessary for admission to the law school may be completed in advance of admission to the law school. The student must be in good standing in the law school at the time of admission to the law school. The student must be in good standing in the law school at the time of admission to the law school.

Unclassified students are required to participate in the work of the course and take examinations. Courses taken by unclassified students will not be credited toward degrees at this Law School.

Continuing Legal Education Students

A simplified admission and registration procedure is provided for members of the bar desiring to register as continuing legal education students to take courses on a non-credit basis. Members of the bar desiring to register as degree candidates or as unclassified graduate students should file the regular application for admission form.

REGISTRATION

Before attending classes each student must present himself in person for registration. No student will be registered in the Law School until proper credentials have been filed and approved (see "Admission", above).

Registration is for the term or session only.

A late registration fee of \$5 will be charged each student who is permitted to register after the regular registration days.

Registration may be changed only with the permission of the Dean.

FEES AND FINANCIAL REGULATIONS

Application fee (charged each applicant for admission and financially)	\$1.00
Tuition fee for each credit hour for regular students	15.00
For the degree of Doctor of Jurisprudence	
For each semester to and including the final examination	40.00
Student Bar Association fee (charged each student by the Law School for membership in the association)	2.00
Graduation fee	2.00
For the printing of the diploma	2.00
For the printing of the certificate of graduation	2.00
For the printing of the diploma and certificate of graduation	4.00
For the printing of the diploma and certificate of graduation (if the student is a member of the Student Bar Association)	5.00
For the printing of the diploma and certificate of graduation (if the student is a member of the Student Bar Association and is a member of the Law School Library)	10.00
For the printing of the diploma and certificate of graduation (if the student is a member of the Student Bar Association and is a member of the Law School Library and is a member of the Law School Gymnasium)	15.00
For the printing of the diploma and certificate of graduation (if the student is a member of the Student Bar Association and is a member of the Law School Library and is a member of the Law School Gymnasium and is a member of the Law School Hall)	20.00
For the printing of the diploma and certificate of graduation (if the student is a member of the Student Bar Association and is a member of the Law School Library and is a member of the Law School Gymnasium and is a member of the Law School Hall and is a member of the Law School Dining Hall)	25.00

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record; (2) the use of University library facilities, except as otherwise designated; (3) admission to all public university, unless otherwise specified; (4) subscription to the *University Hatchet*, the

student newspaper; (7) admission to University debates; (8) medical attention and hospital services as described under "Health Administration", page 27. These privileges, however, with the exception of the issuance of transcripts, terminate, and a student is no longer in residence, when he withdraws or is dismissed from the University.

PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street NW. No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each term are due and payable in advance at the time of registration.

Subject to the approval of the Treasurer, a student may sign a contract for term charges, except for fees payable in advance, permitting payments as follows:

Fall Term.—One third at the time of registration; one third on November 3; one third on December 3.

Spring Term.—One third at the time of registration; one third on March 3; one third on April 3.

A student who fails to meet payments when due but who pays his fees on or before the fifteenth of the month in which payment is due is charged a service fee of \$1. A student who fails to meet payments by the fifteenth of the month in which payment is due will be automatically suspended and may not attend classes until he has been officially reinstated and has paid all accrued fees and a reinstatement fee of \$5.

A student suspended for failure to meet payments when due may not be reinstated for the term after two weeks from the date of suspension. Applications for reinstatement are to be made to the Office of the Cashier.

WITHDRAWALS AND REFUNDS

Application for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Notification to an instructor is not an acceptable notice.

In authorized withdrawals and changes in schedules, financial adjustments will be made as follows:

Fall Term.—Withdrawal dated on or before October 31, cancellation of two-thirds of tuition charges; withdrawal dated on or before November 30, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to November 30.

Spring Term.—Withdrawal dated on or before February 29, cancellation of two-thirds of tuition charges; withdrawal dated on or before

March 31, cancellation of one third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to March 31.

In no case will a refund be made of the first third of the total tuition charges unless the registration is in advance and the course is dropped before the regular registration day. In this case a withdrawal fee of \$5 is charged and tuition fees refunded. In no case will tuition be reduced or refunded because of nonattendance upon classes.

Payment applies only to the term for which a registration charge is incurred and in no case will this payment be credited to another term.

Authorization to withdraw and certification for work done will not be given a student who has not a clear financial record.

Withdrawal from a course or from the University between October 31 and the end of the fall term and between February 20 and the end of the spring term is permitted only in exceptional cases.

The grade of *F* (to be counted as zero) will be given in a course dropped without the approval of the Dean.

All charges for courses dropped without the approval of the Dean must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

FELLOWSHIPS, SCHOLARSHIPS, PRIZES, LOAN FUNDS

Teaching Fellowships.—A limited number of teaching fellowships are available each year to prospective candidates for the Master of Laws degree. Each fellow receives an annual stipend, plus tuition for the academic year. The occupant of each of these fellowships follows an approved program of study and research, assists members of the Faculty in the guidance of first year students, and supervises student work in legal bibliography and the drafting of legal instruments. Upon satisfactory completion of the year's work a fellow is recommended for the degree of Master of Laws. Applications should be submitted to the Dean of the Law School not later than March 1 preceding the period for which the fellowship is to be awarded.

Charles Worthington Dorcey Memorial Scholarship.—This scholarship, established in 1947 as a memorial to Charles Worthington Dorcey, Bachelor of Laws, '81, Master of Laws, '82, is awarded upon the recommendation of the Faculty of the Law School to a needy and promising graduate of the Faculty of the Law School or other division of the University, with a Bachelor of Arts or other equivalent degree, who has maintained an average of *B* as an undergraduate student and who desires to pursue the study of law as a full-time student. The scholarship covers tuition for the course leading to the first degree from the Law School, Bachelor of Laws or Juris Doctor, provided that the holder maintains an average of

B. The right is reserved to suspend the benefits of the scholarship for cause at any time. The scholarship is awarded ordinarily once every three years.

Late School Scholarships.—Scholarships are available each year in the Law School to graduates of accredited colleges. Each scholarship provides full three-years' tuition in the morning division of the Law School. Candidates must have graduated in the upper fifth of their class and must have demonstrated qualities of leadership in addition to scholastic attainment. To retain the scholarship, the successful candidate must maintain a *B* average. Application must be made before February 1 to the Dean of the Law School.

Ellsworth Prize.—The Ellsworth Prize of \$25, established by the late Mr. Fritz von Briesen, is awarded to the student doing the best work in the subject of Patent Law Practice.

John Bell Larner Prize.—This prize, established by the bequest of John Bell Larner, consists of a medal which is awarded annually to that member of the graduating class in the Law School who attains the highest average grade in the entire course for the degrees of Bachelor of Laws or Juris Doctor.

John Ordronaux Prizes.—These prizes were established in 1900 by the bequest of John Ordronaux.

The amount of \$75 is awarded annually to the student in the Law School who has attained the highest average grade in the first year, full-time course; and \$75 to the student who has attained the highest average grade in the second year, full time course.

Through the generosity of friends of the University a number of loan funds are available to students in the Law School. Among them is the Henry Strong William A. Maury Loan Fund established by the Henry Strong Educational Foundation in memory of Henry Strong and William A. Maury. Application for loans should be made to the Treasurer of the University.

REGULATIONS

Students in the Law School are subject to, and are expected to familiarize themselves with, the general University regulations stated in the University Catalogue.

AMOUNT OF WORK

Students without substantial outside employment may take a program of studies of fourteen hours a week in which the majority of hours must be in the morning sections. Students, whether in the morning or evening division, with substantial outside employment must take a limited program of studies not exceeding ten hours a week. Students

taking a majority of their classes in the evening may not take more than ten hours a week. A minimum schedule of ten hours in the morning division and six hours in the evening division is required except in exceptional circumstances when authorized by the Dean.

ATTENDANCE

Regular attendance at classes is required and is necessary for successful work. A student who is deficient in class attendance in any course may, by action of the Faculty, be barred from taking the examination.

Attendance at classes is limited to students registered to take them for credit. "Auditing" classes is not permitted.

RESIDENCE REQUIREMENTS

Candidates for the degree of Bachelor of Laws must complete a residence period of three academic years. Attendance in the morning division for the fall and spring terms constitutes residence for an academic year; similar attendance in the evening division constitutes residence for three-fourths of an academic year. Consequently, a morning student must attend six terms to meet residence requirements; an evening student must attend eight. Students authorized to take schedules of less than ten hours in the morning division in any particular term, or less than six hours in the evening division, receive residence credit on a proportional basis. Students who attend the summer term receive fractional residence credit.

Students planning to attend summer school sessions at other law schools and desiring to use credits obtained at such schools in their course at this Law School must first have the courses they wish to take approved by the Dean. In no event will credits be recognized in excess of those which might be obtained in a similar period in this School.

A student admitted with advanced standing must complete one academic year of residence and pass twenty-eight credit hours with an average of at least C in order to qualify for the degree of Bachelor of Laws.

GRADUATION REQUIREMENTS

Application for Graduation.—Application for a degree should be filed in the Office of the Registrar at the time of registration for the last term of the senior or final year.

Presence at Graduation.—A candidate is required to be present at the graduation exercises unless written application for graduation in absentia is approved by the Dean.

EXAMINATIONS

Written examinations are held at the end of each course. Every student is required to take the regular examinations unless excused. No excuse for absence will be granted except by the Dean and then only for illness or other emergency. Application for excuse must be made in writing not later than one month after the date of the examination. A grade of *NG* (no grade) will be entered on the record of a student thus excused, and he may take the next regularly scheduled examination in the course for which the excuse has been granted.

No special examinations will be given; except that, upon written application to the Dean, showing sufficient cause, a candidate for a degree at a convocation before the next regular examination, if he would be entitled to take a postponed examination, may, at the discretion of the Faculty, be given a special examination.

If a student fails to take an examination, a grade of *F* (to be counted as zero) will be recorded unless the student has obtained the Dean's permission to drop the course according to regulations stated on page or to be excused from the examination.

GRADES

Grades are indicated by the letters *A*, excellent, 85-100; *B*, good, 75-84; *C*, satisfactory, 65-74; *D*, poor, 55-64; below standard for graduation; *F*, failed—below 55, and *NG*, no grade—student excused from failure to take regularly scheduled examination. See "Examinations" above, for grade upon failure to take an examination. The grades *A*, *B*, *C*, and *D* mean that the work has been completed and credit given for the courses. *F*, failed, means that no credit will be given. To obtain credit the student must repeat the course, but a student who has obtained an average of *C* in the work of the term just completed and the preceding term and received a grade of *F* in only one course during those terms may take the next regular examination in that course or a special examination at the end of the next term if he is a candidate for a degree at a convocation before the next regular examination. If on such examination he receives a passing grade he will be given credit in the course. Both grades are recorded.

EXCLUSION AND PROBATION FOR POOR SCHOLARSHIP

Candidates for the Degrees of Bachelor of Laws and Juris Doctor.—A student who in one term or two successive terms, fails in courses aggregating eight or more credit hours will be excluded, except that if currently registered he will be permitted to complete the work of the term. Such a student is not eligible thereafter to be registered in the

Law School or to attend classes. While excluded he may, however, with the consent of the Faculty, be admitted to the regular examinations in those courses in which he has made a grade below passing, and if he receives a grade of passing in those courses with an average sufficient to make his cumulative average not less than C, he will be readmitted.

A student not subject to exclusion under the foregoing rule who at any time fails to maintain a cumulative average of at least C will be placed on probation. A student on probation may at the discretion of the Dean be required to reduce his program of study. If a student on probation does not, by the end of the second term following that in which his average has fallen below C, receive grades sufficient to give him a cumulative average of at least C, he will be excluded, except that if currently registered he will be permitted to complete the work of the term.

The cumulative average of a student includes all the grades in all the courses taken while he is in the Law School as a candidate for a particular degree. When a course is repeated or a reexamination is taken, both the first grade and the subsequent grade or grades are counted in the cumulative average.

In special cases in which a student who has been excluded can clearly demonstrate that his low grades were due to special circumstances beyond his control and that he has the capacity to pursue the study of law with a definite likelihood of success, such student may be readmitted by the Faculty subject to such conditions as the Faculty may impose.

Candidates for Graduate Degrees.—A candidate for one of the graduate degrees whose work is not satisfactory in the opinion of the Faculty, taking into consideration the requirements and standards for the degree, may, by action of the Faculty, be excluded at the end of the term for which he is currently registered.

Unclassified Students.—An unclassified student whose work is not satisfactory in the opinion of the Faculty may, by action of the Faculty, be excluded at the end of the term for which he is currently registered.

CLASSIFICATION OF STUDENTS

Students are divided into classes on the completion of credit hours as follows: first year, one through twenty-eight; second year, twenty-nine through fifty-six; third year, fifty-seven or more.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

STUDENT LIFE

LIVING ACCOMMODATIONS

Women Students.—The Hattie M. Strong Residence Hall provides single rooms at \$35 a month and double rooms at \$30 a month a person. Meals are served at the Student Union. Admission to the University does not include dormitory reservation. Applications for rooms should be made well in advance. Forms for application, together with detailed information, may be obtained from the Director of Activities for Women.

Girls under the age of twenty-one who are enrolled for six or more credit hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women, upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory, except with persons approved by the Director of Activities for Women.

Men Students.—Welling Hall provides double room facilities for 102 students. Rooms rent for \$24 a month a person. Dining facilities are available to all residents. Meals are also served at the Student Union. Application forms for room reservation may be obtained from the Director of Activities for Men, Building R, 2027 H Street NW.

Information concerning private rooming and boarding facilities near the University, for women students twenty-one years of age or older and for men students, may be obtained at the Housing Office. The reservation of rooms in private houses must be made by students.

PLACEMENT OFFICE

The University Placement Office, 2114 G Street NW., provides assistance to students seeking full and part time employment. This office maintains a registry of positions locally and nationally available and refers qualified applicants for consideration. Information is also available on Civil Service examinations.

HEALTH ADMINISTRATION

The University maintains a health service that is primarily diagnostic in its intent. For medical emergencies and health consultations there is, on the Campus, a Student Health Clinic open from 9:00 A.M. to 5:00 P.M., with physician and nurse in attendance. There is also a rest room for women, with a graduate nurse in charge.

Medical privileges include: (1) the physical examination of every student entering from secondary school; (2) three visits by the University physician or surgeon, office or residence (District of Columbia), in any one illness, exclusive of a specialist, surgical operation, laboratory, or X-ray examination; (3) hospitalization, including board and nursing in the University Hospital for not more than one week during any twelve month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration. This medical benefit does not apply to illness or disability incurred previous to the University term or prior to payment of tuition fees.

The student is allowed, if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

Rules: (1) The Director of Health Administration is empowered to limit or deny the medical benefits where, in his discretion, a student has, by his misconduct or breach of the rules of the University, made himself ineligible; (2) the Director of Health Administration has authority to determine the necessity and length of hospitalization; (3) a student who has severed his connection with the University is ineligible for medical benefits; (4) a student intending to train for an athletic team is required to pass a thorough examination at the beginning of each term; (5) the above regulations apply also during the summer term of the University. The University is not responsible for injuries received in inter-collegiate or intra-mural games, or in any of the activities of the departments of physical education.

PLACEMENT SERVICE FOR GRADUATES

The Law School takes a continuing interest in the placement of its graduates and maintains a placement service for that purpose. The Dean, the Faculty, and the University Placement Office cooperate in collecting information from alumni of the Law School, law firms, and government agencies concerning opportunities for legal positions throughout the country. Students and recent graduates are invited to discuss their placement problems with the Assistant Dean in charge of placement.

THE DEGREES OF BACHELOR OF LAWS AND JURIS DOCTOR

The programs of study leading to the degrees of Bachelor of Laws and Juris Doctor are addressed to the development and application of legal principles, skills, and ideals which are indispensable to the equipment of a lawyer for professional responsibility and leadership in modern society. They include, first and foremost, the traditional core of legal education, namely, the study of legal materials—*common law*, statutory and administrative—and instruction in the technique of their use. These programs include the study of the nature and purpose of law, the history of the Anglo-American legal system, and the history and standards of the legal profession; practice in the skills of legal research and legal writing; elementary training in trial practice; and, through the medium of seminars, experience in group handling of legal problems.

REQUIREMENTS FOR THE DEGREES

BACHELOR OF LAWS

To be recommended for the degree of Bachelor of Laws (LL.B.) the student must have completed a residence period of not less than three academic years (four years for evening students) and eighty credit hours with a cumulative average of at least *C*.

JURIS DOCTOR

The degree of Juris Doctor (J.D.) is conferred as a recognition of the completion at the George Washington University Law School, with high rank, of the required program of study for the Bachelor's degree, including experience in research and legal authorship. To be recommended for this degree the student must have completed: (1) a residence period of not less than three academic years (four years for evening students) in the Law School; (2) eighty credit hours with a cumulative average of at least *B* including one of the following courses: Comparative Law, Jurisprudence, or one of the graduate seminars; and (3) one year of acceptable service on the board of student editors of *The George Washington Law Review*, election to which is subject to regulations laid down by the Faculty.

HONORS

The degree of Bachelor of Laws or of Juris Doctor "with distinction" will be awarded students who obtain a cumulative average of *A*.

CURRICULUM

Required and Elective Courses.—A program of required and elective courses has been developed in order to assure coverage of the basic

courses as well as to allow a degree of flexibility to meet the diverse interests of students. All first-year courses, three second-year courses, and one third-year course are required, leaving a total of thirty-six hours of electives. In general, second-year students are restricted to second-year electives but in appropriate cases the taking of third-year electives will be approved. Similarly, specially qualified third-year students may secure approval to take graduate courses and research in public law.

Practice and Trial Practice Court.—Classroom instruction is conducted in pleading and procedure, trial and appellate practice, and evidence. This instruction includes grounding in the principles of the Federal Rules of Civil Procedure and the Federal Rules of Criminal Procedure. In addition, each senior student is required to participate in the work of the Trial Practice Court, which includes the trying of cases as junior counsel and as senior counsel. A special section of the court is devoted exclusively to the trial of patent cases. Experience in preparing and arguing appellate court cases is available through the Case Club Competition.

Patent Law.—Students interested in patent law should take the following group of courses: Unitar Trade Practices, Substantive Patent Law, Patent Office Practice, Patent Trial Practice Court, Federal Anti-Trust Laws, and Trade Regulation Seminar.

Curriculum.—Following is the curriculum for students beginning in the fall term. Adjustments are made to meet the needs of students beginning in the spring and summer terms.

Morning Division

FALL TERM		FIRST YEAR		SPRING TERM	
Courses	Hours	Courses	Hours	Courses	Hours
Legal Method and Legal System	4	Legal Method	4	Legal Method	4
Constitution I	4	Legal History	4	Constitution II	4
Property	4	Legal Philosophy	4	Legal History	4
Criminal Law	4	Legal Research	4	Legal Philosophy	4
Total	16	Total	16	Total	16
FALL TERM		SECOND YEAR		SPRING TERM	
Courses	Hours	Courses	Hours	Courses	Hours
Legal Method	4	Legal Method	4	Legal Method	4
Constitution and W.	4	Legal History	4	Legal History	4
Property	4	Legal Philosophy	4	Legal Philosophy	4
Criminal Law	4	Legal Research	4	Legal Research	4
Total	16	Total	16	Total	16

THIRD YEAR			
FALL TERM	Credits Hours	SPRING TERM	Credits Hours
Total Practice Court	2	Total Practice Court	2
Electives	10	Electives	10
Total	12	Total	12

Evening Division

FIRST YEAR			
FALL TERM	Credits Hours	SPRING TERM	Credits Hours
Legal Method and Legal System	4	Trusts	2
Contracts I	4	Contracts II	4
Personal Property	2	Commercial Law	4
Total	10	Total	10

SECOND YEAR			
FALL TERM	Credits Hours	SPRING TERM	Credits Hours
Real Property	4	Chartered and Inc.	1
Cost of Proceedings	4	Insurance	1
Conveyances and Wills	2	Conveyances and Wills	2
Total	10	Total	4

THIRD YEAR			
FALL TERM	Credits Hours	SPRING TERM	Credits Hours
Electives	4	Electives	4
Total	10	Total	10

FOURTH YEAR			
FALL TERM	Credits Hours	SPRING TERM	Credits Hours
Total Practice Court	2	Total Practice Court	2
Electives	8	Electives	8
Total	10	Total	10

GRADUATE PROGRAM

DEGREES OF MASTER OF LAWS AND DOCTOR OF JURIDICAL SCIENCE

The administration of justice under law is a matter so vast and complex that some graduates feel the need for further study in order to

broaden and deepen their understanding of the law. Others desire to extend their study into rapidly developing specialized fields. Graduate instruction, leading to the degree of Master of Laws, is therefore offered to enable qualified students to attain one or both of these objectives.

The degree of Doctor of Juridical Science is offered for selected students whose aim is to extend still farther their studies by pursuing original research in law.

Graduate work is available to evening as well as morning students in order that lawyers in private practice and in government service may engage in advanced study or in original research.

PROGRAMS OF STUDY FOR FOREIGN LAWYERS

Two programs of study are provided to meet the needs of lawyers who come from countries whose legal systems are not based on the English law. For such lawyers, whose aim is to acquire an understanding of our system so that they may work intelligently with its materials and practitioners after returning to their own countries, there is available the degree of Master of Comparative Law. For foreign lawyers, however, who wish to practice in a common law jurisdiction there is available the degree of Master of Comparative Law (American Practice) with an appropriate program of study. With respect to both programs, the students are not assigned to special classes but work in association with the other students in the regular courses, each student's program being adapted to his individual needs.

NON-DEGREE STUDY: CONTINUING LEGAL EDUCATION

As a result of changes and expansion in various fields of the Law many lawyers pursue graduate study in order to keep abreast of current developments. Consequently, an important part of the graduate program is to provide for members of the bar not desirous of becoming degree candidates. The offerings in the field of governmental regulation provide opportunities for specialization. Although third year and graduate courses are particularly suitable, first year and second year courses may be taken in appropriate cases. Members of the bar taking graduate work in this way register as unclassified students or as continuing legal education students.

RESEARCH IN PUBLIC LAW

Research in public law is conducted under the supervision of members of the Faculty. The purpose of this research is to furnish means for training specialists in public law, either as government lawyers or as

lawyers representing individuals or corporations in cases in which the Government is a party, and to assist in the analysis, clarification, formulation, and improvement of public law, substantive and procedural.

Candidates for the graduate degrees in the Law School and specially qualified seniors may pursue this work.

REQUIREMENTS FOR THE DEGREES

MASTER OF LAWS

To be recommended for the degree of Master of Laws (LL.M.) the student must have completed a residence period of not less than two terms. Such residence should normally be continuous. All requirements for the degree must be completed in this Law School and in a period not exceeding two years after registration for work for the degree. The student must have completed, with a minimum average of B, twenty credit hours in courses listed in the Law curriculum as graduate courses except that in appropriate cases third year courses may be approved for inclusion in the program of study if not previously taken.

MASTER OF COMPARATIVE LAW

The degree of Master of Comparative Law (M.Comp.L.) is for foreign students who intend to return to their countries. To be recommended for this degree the student must have completed a residence period of not less than one academic year. He must have completed satisfactorily twenty-four credit hours in approved courses in the curriculum of the Law School or of such other departments of the University as the Faculty of the Law School shall approve.

MASTER OF COMPARATIVE LAW (AMERICAN PRACTICE)

The degree of Master of Comparative Law, American Practice (M.Comp.L.(Am.Prac.)) is for foreign students who intend to remain in this country. To be recommended for this degree the student must have completed a residence period of not less than one academic year. He must have completed twenty-eight credit hours in approved courses in the curriculum of the Law School with a cumulative average of at least C.

DOCTOR OF JURIDICAL SCIENCE

To be recommended for the degree of Doctor of Juridical Science (S.J.D.) the student must have completed a residence period of not less than one academic year. He must have pursued a course of study and research designated by his consultative committee and approved by the Committee on Graduate Studies. At the conclusion of his first year

of residence, or at such other time as the Committee on Graduate Studies may set, the candidate must pass an oral examination in those fields of study selected by the consultative committee. This examination shall be conducted by the consultative committee and such other members of the Faculty and qualified experts from other research institutions as may be selected by the Committee on Graduate Studies.

Not later than the date specified in the University calendar the candidate must submit to the Dean one typewritten original and two legible and complete carbon copies of his dissertation in its final form. The dissertation must contain a summary of from 2,500 to 3,000 words in serial as an appendix. An additional original typewritten copy of this summary must be submitted for publication. To be acceptable the dissertation must, in the opinion of the examining committee, constitute a substantial contribution to the field of law concerned and be suitable for publication. Additional information will be supplied by the Chairman of the Committee on Graduate Studies.

The summaries of accepted dissertations will be printed in a volume forming a number of the University *Bulletin*. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover the expense of printing the summary of his dissertation.

COURSES OF INSTRUCTION

COURSES OF INSTRUCTION

The courses of instruction listed below are subject to change. The University reserves the right to withdraw any course announced.

The number which precedes the name of a course indicates the term in which that course is offered. An odd number indicates that the course is offered in the fall term; an even number, that it is offered in the spring term; and a double number (e.g., 241-44), that it begins in the fall and continues in the spring term. The letter "x" following an odd course number (e.g., 141x) indicates that the course, normally offered in the fall term, is given in the spring term. The letter "s" following an even course number (e.g., 112s) indicates that the course, normally offered in the spring term, is given in the fall term.

First year courses are numbered from 101 to 200; second-year courses from 201 to 300; third year courses, from 301 to 400; and graduate courses, from 401 to 500.

The number of hours of credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a year course giving two hours of credit each term is marked (2-2), and a term course giving two hours of credit is marked (2).

Morning classes begin at 9:10 a.m. Evening classes begin at 5:50 p.m.

FIRST YEAR

101 *Legal Method and Legal System* (4)

Fryer, Bennett, Davidson,
Burke, Weston

Introduction to study of substantive and procedural law dealing with legal concepts. Emphasis on method and technique of legal work. Some special studies include: status and legal cases, historical background in the use of law books and legal writing. Introduction of concepts in law, legal reasoning, statutory interpretation, and social problems. Under the direction of court officers, use of the court and law practice. Background development of Anglo-American legal system, comparison of the judiciary and the law, statutory interpretation of selected materials. Fryer and Bennett *Founding Legal Method, Cases in Legal System*, 2 vols. ed. 1949. Morning and evening sessions. (Also offered 1955 summer term.)

Law 101x, same as 101, offered spring term. Morning and evening sessions.

111-12 *Contracts I, II* (4-2)

Mayo

Study of contracts, including contracts, general performance of contracts, and their legal consequences, including contracts. Moral, social, and economic considerations, including contracts, legal system, law. Consideration of legal principles, contracts, contracts, Statute of Frauds. Morning and evening sessions.

123 *Criminal Law and Procedure* Murdock, Cooper, Burke
(4)

Origin and purposes of criminal law; elements of criminal liability; mental element; solicitation, attempt, and conspiracy; crimes against the person, against property, and against both; statutory offenses; criminal procedure, with consideration of Federal Rules of Criminal procedure. Morning. (Also offered 1955 summer term.)

Law 125X, same as 123, offered spring term. Evening.

133 *Personal Property* (2) Fryer, Mallison

Concepts of property and ownership; possession, finding, larceny, theft and pledge; acquisition of title by bona fide purchase, adverse possession, acquisition, exclusion, judgment, satisfaction of a judgment, and gift. Morning and evening sections. (Also offered 1955 summer term.)

Law 133X, same as 133, offered spring term. Evening.

138 *Real Property* (4) Benson, ———

Historical background of the law of estates and conveyances; adverse possession; life estate; concurrent estates; covenants, powers, easements, and equitable servitudes; natural rights. Morning. (Also offered 1955 summer term.)

Law 138X, same as 138, offered fall term. Evening.

142 *Torts* (4) Merrifield

Intentional and unintentional interference with the person or tangible things; defamation of the person; malicious prosecution. Morning and evening sections.

150 *Constitutional Law* (4) Collier, Mallison

Historical introduction; judicial approach and methods; doctrine of the separation of powers; powers of the National Government; the federal system and relation of federal and state courts. Morning and evening sections.

SECOND YEAR

205 *Civil Procedure* (4) Burke

Function and composition of pleadings, including their relation to joinder. Emphasis is upon motions as controlled by rules of procedure and the Federal Rules of Civil Procedure. Morning and evening sections. (Also offered 1955 summer term.)

208 *Evidence* (4) Fryer, ———

Functions of court and jury; witnesses; hearsay; opinion and expert testimony; evidence of voluntariness and competency of witness. Morning and evening sections. (Also offered 1955 summer term.)

209-10 *Conveyances and Wills* (2-2) ———

Land interests; conveyances; mortgages; recording; testamentary and intestate succession. Morning and evening sections. (Also offered 1955 summer term.)

- 214 *Legal Accounting* (2) Fey
A study of elementary accounting principles and techniques, application of accounting principles to legal problems. Morning and evening sections. (Also offered 1955 summer term.)
- 218x *Local Government Law* (2) Mallison
Types and objectives of municipal, county, and special purpose local governmental units; intergovernmental relations; regional organizations and planning; lawmaking by local bodies; community planning and development; basic responsibilities of local governmental units. Evening section.
- 223 *Domestic Relations* (2) Mallison
Marriage, divorce, and domestic rights of husband and wife; rights of parent and child; estates. Morning and evening sections. (Also offered 1955 summer term.)
- 247 *Commercial Paper* (4) Orentlicher
Bill of exchange, promissory notes and checks, especially under the Negotiable Instruments Law. Morning and evening sections.
- 258 *Commercial Transactions* (4) Orentlicher
The law relating to the sale and distribution of goods, and to the security financing thereof arising in this connection, with particular attention to the effect of uniform laws. Morning and evening sections.
- 261 *Agency-Partnership* (4) Cooper
Master and servant (vicarious liability); responsibility; agency; nature of agency relation; actual authority; power (discretion and confidential power); unauthorized transactions; power, ratification. Formation of partnership; partnership property; rights and duties of partners; interest in, nature and enforcement of the partnership obligation; dissolution of the partnership; actions by and against partners. Morning and evening sections.
- 270 *Corporations* (4) Weaver
Local incorporation as to jurisdiction of corporate powers and rights of corporations; corporate officers and shareholders. Morning and evening sections. (Also offered 1955 summer term.)

THIRD YEAR

- 303 *Administrative Law* (4) Davison
The position of the administrative process in the separation of powers, including the status of administrative personnel; administrative law; general nature of administrative action; discretion; and rule-making; powers of parties to federal administrative agencies. Davison and Cooper. Course on Administrative Law. Evening section. (Also offered 1955 summer term.)
Law text, notes at 1954, offered spring term. Morning.
- 308 *Brief Writing and Oral Argument* (2) Warner
Expectation and study of the basic techniques of written and oral legal argumentation. Each student will be required to write, as a term paper, a brief presenting questions raised on the actual record in an unargued case. Evening.

- [illegible]

331 *Labor Arbitration* (2)

Merrifield

Labor arbitration and collective bargaining. The role of the lawyer in the negotiation and interpretation of collective labor agreements, contract procedure, and arbitration (not in labor arbitration). Evening.

333 *Legislation* (2)

Mullison

The legislative process, with particular emphasis on its operation in the Federal and state governments, legislative administration and procedure. Study of various statutory interpretations. Morning. (Also offered next semester.)

335-36 *Trial Practice Court* (2-2)

Lewis, Morris, Kirkland, Lilgerton,
Myers, Jackson, Herrick, Mink,
Kendrick, Sankler

Trial of simulated cases, with lecture and discussion. Federal and court rules procedure primarily in Federal Rules.
To be taken in the same year. Prerequisite: Law 205 and 206.
Morning and evening sessions.

337 *Future Interests* (2)

Bennison

Future interests in common law and under modern statutes, including the doctrine of limitation, power of appointment, rule against perpetuities. Evening.

Law 317A, 317B, 317C, offered spring term. Morning.

340 *Constitutional Interpretations* (4)

Collier

Advanced course in constitutional law. The Constitution and modern judicial decisions of Federal government, separation of powers, federalism, limitations on legislative power, and significance of "due process" in various governmental developments. Introduction to comparative constitutional law, with studies in the constitutional law of selected states of the Union. (Not offered in 1952-53.)

345 *Substantive Patent Law** (2)

Harris

Substantive patent law, patentability, validity, use, and enforcement of patents. Evening.

346 *Patent Office Practice** (2)

Rise

Rules and practice of the patent office, interference procedure. Evening.

349-50 *Patent Trial Practice Court** (2-2)

Henry, Geniesse

Practice before the United States Court of Customs and Patent Appeals, the District Court of the United States for the District of Columbia, and the Court of Appeals for the District of Columbia, with study sections 141 and 142 of U. S. Code. Two cases the United States Patent Office in infringement. Evening.

Law course may be waived based on Law 317-41 to satisfy the Trial Practice Court requirement. Both courses may not be waived toward a degree.

*Law 345, 346, 349-50, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

351X *Public Utilities* (2)

Fryer

Regulation by governmental agencies concerned with power rates, dealing principally with questions related and determination of rate of return based on "net investment" doctrine. Study of regulatory employed in original proceedings and nature of judicial review. Examination of policies underlying national control over distribution of electricity and natural gas. Evening.

365 *Government Contracts I* (2)

McIntire

A consideration of the basic power of the Federal Government to enter into contracts; the nature and construction of such contracts; normal and war or defense power aspects of Government procurement, including administrative and legislative policy and procedure; forms of contracts; standard clauses; advertised bid procedure problems; negotiated contracts; modification of contracts; remedies on contractual claims. Evening.

366 *Government Contracts II* (2)

McIntire

Special problems in Government contracts, including adjustments and relief stated by contract for nullification of industrial contracts; special relief provisions; efforts toward contract procurement delivery; settlement of protesting claims under Government contracts; attempts at price, cost, or profit controls; termination. Evening.

369 *Jurisprudence* (4)

Collier

History of jurisprudence; schools of jurists, particularly the nineteenth century schools; sociological jurisprudence; theories of justice; the nature of law; law and morals; law and the state; the state and subject matter of law; sources and forms of law; the traditional elements; analysis of general legal concepts. Evening.

373 *Taxation* (2)

Collier

Introductory course in basic concepts of federal tax system. Attention given to state inheritance and income taxes. Problems of jurisdiction in tax, construction of tax statutes, methods of judicial review of administrative action in the tax field, modern excise taxes on business concerns. (Not offered in 1955-56.)

374 *Taxation—Federal Estate and Gift* (2)

Driscoll

Specific problems in federal estate and gift taxation, with consideration of relevant state inheritance tax problems. Morning and evening sections.

375 *Taxation—Federal Income* (4)

Fey, Driscoll

A study of the federal income tax, including construction of statutes, practice and procedure, and legislative policy in the development of the income tax structure. Morning and evening sections. (Also offered 1955 summer term.)

377 *Unfair Trade Practices* (4)

Weston

Unfair trade practices at common law and under state and federal statutes. Trade-marks and trade names including Trade Mark Act of 1906. Misrepresentation. False advertising at common law. Federal Trade Commission jurisdiction over misrepresentation practices.

License and trademark. Disparagement of competitor's goods and passing off. State Fair Trade Act (rules over manufacturers' price discrimination (State and Federal Robinson-Patman Act)). State business practices rules follow suit. Inducing breach of contract. Commercial injury. Miscellaneous business torts constituting unfairness and interference with advantageous business relations. *Unfair Trade Practices, Cases, Comments and Materials* (1954). Merging and evening sections.

378 *Federal Anti Trust Laws* (4)

Weston

Restraints of trade as common law. Public policy under Sherman Anti Trust Act of 1890 and Federal Trade Commission and Clayton Act. Includes merger, consolidation, and monopoly. Less anticompetitive activities (price fixing agreements, trade associations, international cartels). Specific practices such as resale price maintenance, delivered price systems, exclusive arrangements and tying devices, trade inquiries. Patents and monopolies under antitrust laws. Remedies. *Questions, Cases on Federal Anti-Trust Laws*. Evening.

381 *Trusts* (4)

Weaver

Creation, elements, administration, enforcement, termination. Liability to and of trust property. Resulting and constructive trusts. *Questions, Cases on Trusts*, 2d ed. Morning and evening sections. (Also offered 1955 summer term.)

383 *Military Law and Jurisdiction* (2)

Wiener

Source of military jurisdiction, military law system, including criminal jurisdiction and procedure before, during and after trial, military government, martial law, laws of war and treatment of offenders. (Not offered in 1954-55.)

386 *Aviation Law* (2)

Procedure before Civil Aeronautics Board, legal problems arising in connection with air transportation and airports, international convention and regulations. (Not offered in 1954-55.)

388 *Admiralty* (2)

Colebrook

Federal and state jurisdiction, jurisdiction over waters, ships, contracts, torts, crimes, in maritime matters, etc.; laws applicable to maritime workers and maritime liens. *Sprague and Howe, Cases on Admiralty*. Evening.

391 *Regulation of Communicating Media* (2)

Mayo

An examination of the legal doctrine relating to regulatory practices in the channels of mass communications, i.e., newspapers, radio, television media and the pattern of control exercised by government, private ownership, and various community groups; appraisal of the comparative ability of various regulatory techniques for implementing policies affecting these media; special emphasis will be placed on the functions of the Federal Communications Commission. Evening.

GRADUATE COURSES

403x *Administrative Law Seminar* (2)

Davison

Group study of specific problems in administrative law. Evening.

- 405 *Legal Problems in Modern Methods of Warfare* (2) Malison
The study of modern international law is now the last great of modern methods of warfare (including, however, the study of modern law and warfare); the nature and character of modern legal problems (physical, technological, and political) require it. (Not offered in 1955-56.)
- 408 *Regulation of Securities and Securities Markets* (2) Kroil
A study of state and federal laws governing the offering and sale of securities, or securities in the market, by individual issues and by the regulation of securities markets, and the effect and impact of such changes upon the market. Particular emphasis will be given to the system administered by the Securities and Exchange Commission, 1933-37 and subsequent laws.
- 410 *Labour Standards and Social Security Legislation* (2) Merritt
Legal problems arising under federal and state statutes dealing with labor standards and social security. Particular emphasis is given to the regulation of wages and hours, workers' compensation, and state unemployment insurance and old age. (Not offered in 1955-56.)
- 414 *Control and Use of Atomic Energy* (2) Mayo
Various legal problems arising in the control and use of atomic energy will be examined, including the Atomic Energy Act. The course will deal with the present government, especially the control of atomic energy, atomic energy, international law, the regulation of atomic energy, international law, and the control of atomic energy. (Not offered in 1955-56.)
- 415 *Comparative Law* (4) Madock
Theoretical and comparative study of the legal systems of the United States and Canada. Law (law of State and Country) and the law of comparative law. Comparative study of the law of the United States and Canada. Comparative study of the law of the United States and Canada. Comparative study of the law of the United States and Canada. (Not offered in 1955-56.)
- 410 *Law and Trade Seminar* (2) Fryer
Study of current problems involving international law, international law and trade relations in connection with the United States and the United States of America and other countries in the field of international law. 1955-57 and alternate years.
- 417 *Legislative Drafting* (2) Zick
Advanced instruction and practice in legislative drafting. (Not offered in 1955-56.)
- 421 *Constitutional Law Seminar* (2) Collier
Course study of constitutional problems in constitutional law. (Not offered in 1955-56.)

- 42x *Criminal Procedure and Administration* (2) Campbell
Covers study of the fundamental aspects of criminal procedure with special emphasis on problems before the District of Columbia and includes the history, the law of arrest, search, and seizure; pre-arrestation; the function of the preliminary examination and grand jury; indictment of individuals, trial procedure, and the rules of plea and venue. Time to be allotted.
- 425 *Law of the Near East* (2) Liebesny
A study of the law of the Arab countries, including the legal tradition of the Islamic law, an exposure of the present day codes, with an appreciation of the Western influence on the laws of the Arab countries. 1 hour.
- 427 *World Law* (2) Mallison
The United Nations as a body of common law; a study of international law. 1 hour.
- 43x *International Law Seminar* (2) Murdock
Group study of contemporary problems in international law. Evening.
- 432 *Comparative Law Seminar* (2) Murdock
Group study of contemporary problems in comparative law. Evening.
- 437 *Monetary Law* (2) Daulton
Introductory lecture of the provisions of public law by which money is authorized subject specifically to the Federal Reserve System. The legal character of public debt of business obligations, local taxes, "gold certificates," gold and the International Monetary Fund, Treasury notes and bank checks. Problems connected with the issue of the monetary system of money supply, control of currency, money of value, monetary unit of business conduct at large, position. (Not offered in 1968-69.)
- 451x *Trade Regulation Seminar* (2) Weston
Group study of current economic reaction to safety trade practices and federal regulatory acts. Evening.
- 455 *Corporate Taxation* (2) Driscoll
Case law and 1954 Internal Revenue Code provisions applicable to corporations, partners of unincorporated associations, and estates of decedents, estate tax and income tax, computation of partnership income, accumulated earnings tax and carry-over. Morning and evening sessions.
- 458 *Oil and Gas Taxation* (2) Driscoll
A study of the case law relating to ownership, depletion, sales and transfers of interests in oil and gas production, legal aspects of taxation methods in oil and gas operations, application of partnership and corporation provisions of the 1954 Internal Revenue Code to oil and gas activities. Evening.

- 450 *Taxation of Foreign Income Seminar* (2) Driscoll
Group study of methods of taxing income received from abroad and taxation of non-resident aliens; analysis of principal income taxation and estate taxation treaties; consideration of legislative proposals for taxation of foreign income. Evening.
- 461 *Taxation Seminar I* (2) Driscoll
Group study of special problems and recent developments in federal taxation relating to corporations. (Not offered in 1955-56.)
- 462 *Taxation Seminar II* (2) Driscoll
Group study of special problems and recent developments in federal taxation relating to partnerships, trusts, estates, and individuals. Not offered in 1955-56.)
- 466 *Estate Planning Seminar* (2) Weaver
Consideration of the problems involved in planning an effective and economical gift distribution of property interests. Topics: estates; both inter vivos and testamentary; will be considered in the light of the results currently sought by the donor and the tax consequences and restrictions suggested by the law of property, wills, future interests, insurance, and federal and state taxation. Evening.
- 468 *Labor Law Seminar* (2) Merrifield
Group study of contemporary problems in labor law. Evening.
- 470 *Food and Drug Law* (2) Goodrich, Kleinfeld
A lecture and discussion course dealing with the Federal Food, Drug, and Cosmetic Act and governmental controls thereunder. Both government and industry viewpoints are considered. Evening.
- 471 *Research in Public Law* (2) The Staff
Research in public law under supervision of a member of the Faculty. Time to be arranged.
Law 4713, same as 471, offered spring term. Time to be arranged.
- 473 *Research in Patent, Trade-Mark, and Copyright Law* (2) Harris
Research in patent, trade-mark, copyright, and related systems of law under supervision of a member of the Faculty and in consultation with the Patent, Trade-Mark and Copyright Foundation. Time to be arranged.
Law 4733, same as 473, offered spring term. Time to be arranged.

DEGREES CONFERRED

BACHELOR OF LAWS

JUNE 9, 1954

[illegible]

Robert Martin Neal	Ga.	Thursday 11-16-54	N.Y.
A.B. 1948, A.M. 1949, Emory University		B.D.A. 1948, College of the City of New York	
Philip J. Lane	D.C.	Friday 11-17-54	N.Y.
A.B. 1945, Columbia University		A.B. 1947, Cornell College	
Arthur Joseph Williams	Wash.	A.M. 1947, Columbia University	Wash.
John James Finkbeiner	Wash.	James Lee Smith	
A.B. 1944, Johns Hopkins University		1944, 1945, Johns Hopkins University	
LeRoy P. Pugh	Md.	1945, 1946, Johns Hopkins University	Va.
A.B. 1941, The George Washington University		1946, 1947, Johns Hopkins University	Wb.
Arthur Pugh	Md.	1947, 1948, Johns Hopkins University	Ga.
A.B. 1942, 1943, The George Washington University		1948, 1949, Johns Hopkins University	
Roger Pugh	Md.	1949, 1950, Johns Hopkins University	Maine
A.B. 1942, University of Maryland		1950, 1951, Johns Hopkins University	
Nathan Archibald Pugh	N.H.	1951, 1952, Johns Hopkins University	Ohio
A.B. 1942, University of New Hampshire		1952, 1953, Johns Hopkins University	W.Va.
John Pugh	Tenn.	1953, 1954, Johns Hopkins University	Utah
John Pugh	Tenn.	1954, 1955, Johns Hopkins University	
A.B. 1948, Harvard University		1955, 1956, Johns Hopkins University	
Arthur Pugh	Md.	1956, 1957, Johns Hopkins University	Ga.
A.B. 1948, Johns Hopkins University		1957, 1958, Johns Hopkins University	
Arthur Pugh	N.M.	1958, 1959, Johns Hopkins University	Ohio
B.S. 1948, Johns Hopkins University		1959, 1960, Johns Hopkins University	Md.
Nathan Pugh	Va.	1960, 1961, Johns Hopkins University	
B.S. 1948, Johns Hopkins University		1961, 1962, Johns Hopkins University	Va.
David Pugh	Tenn.	1962, 1963, Johns Hopkins University	N.Y.
A.B. 1948, A.M. 1949, The George Washington University		1963, 1964, Johns Hopkins University	
John Pugh	Md.	1964, 1965, Johns Hopkins University	Va.
B.S. 1948, Johns Hopkins University		1965, 1966, Johns Hopkins University	
John Pugh	D.C.	1966, 1967, Johns Hopkins University	N.Y.
A.B. 1948, The George Washington University		1967, 1968, Johns Hopkins University	

NOVEMBER 11, 1954

Margaret Ann Brand	N.Y.	1948, 1949, Johns Hopkins University	D.C.
A.B. 1948, Johns Hopkins University		1949, 1950, Johns Hopkins University	D.C.
John M. Brand	D.C.	1950, 1951, Johns Hopkins University	Md.
A.B. 1948, The George Washington University		1951, 1952, Johns Hopkins University	
John Brand	Md.	1952, 1953, Johns Hopkins University	Ill.
A.B. 1948, Johns Hopkins University		1953, 1954, Johns Hopkins University	
John Brand	D.C.	1954, 1955, Johns Hopkins University	Ill.
A.B. 1948, Johns Hopkins University		1955, 1956, Johns Hopkins University	
John Brand	Md.	1956, 1957, Johns Hopkins University	N.Y.
A.B. 1948, Johns Hopkins University		1957, 1958, Johns Hopkins University	
John Brand	N.Y.	1958, 1959, Johns Hopkins University	N.Y.
A.B. 1948, Johns Hopkins University		1959, 1960, Johns Hopkins University	N.Y.
John Brand	N.Y.	1960, 1961, Johns Hopkins University	
A.B. 1948, Johns Hopkins University		1961, 1962, Johns Hopkins University	Pa.
John Brand	N.Y.	1962, 1963, Johns Hopkins University	Va.
A.B. 1948, Johns Hopkins University		1963, 1964, Johns Hopkins University	Mass.
John Brand	Ill.	1964, 1965, Johns Hopkins University	
A.B. 1948, Johns Hopkins University		1965, 1966, Johns Hopkins University	Md.
John Brand	Md.	1966, 1967, Johns Hopkins University	
A.B. 1948, Johns Hopkins University		1967, 1968, Johns Hopkins University	
John Brand	D.C.	1968, 1969, Johns Hopkins University	
A.B. 1948, Johns Hopkins University		1969, 1970, Johns Hopkins University	

Edmund A. [unclear]			
Ed. [unclear] [unclear] State Teachers	Va	Edw. Allen [unclear]	Va
AM [unclear]		[unclear] 1911, Northwestern University	
W. [unclear] [unclear] The College		Edna [unclear] [unclear]	18
Am. [unclear] [unclear]		D. [unclear] [unclear] University of	
AP [unclear] [unclear] Washington	Miss	Albert [unclear] [unclear]	Me
Russ. [unclear]		[unclear] 1911, [unclear] University	
Ed. [unclear] [unclear] [unclear] [unclear]	MI	[unclear] [unclear] [unclear] [unclear]	
Edna [unclear] [unclear] [unclear] [unclear]	N.J.	Charles [unclear] [unclear]	V.
Ed. [unclear] [unclear] [unclear] [unclear]	Miss	A. [unclear] [unclear] [unclear]	
AM [unclear] [unclear] [unclear] [unclear]		Vernon [unclear] [unclear]	V.
Ed. [unclear] [unclear] [unclear] [unclear]	N.J.	[unclear] [unclear] [unclear] [unclear]	
AM [unclear] [unclear] [unclear] [unclear]		Living [unclear] [unclear]	V.
Ed. [unclear] [unclear] [unclear] [unclear]	MI	A. [unclear] [unclear] [unclear] [unclear]	
Ed. [unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
Ed. [unclear] [unclear] [unclear] [unclear]	MI	[unclear] [unclear] [unclear] [unclear]	D.C.
Ed. [unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
Ed. [unclear] [unclear] [unclear] [unclear]	R.I.	William [unclear] [unclear]	N.H.
Ed. [unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
Ed. [unclear] [unclear] [unclear] [unclear]	MI	Wm. [unclear] [unclear]	
Ed. [unclear] [unclear] [unclear] [unclear]	Va	[unclear] [unclear] [unclear] [unclear]	
Ed. [unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	Me
Ed. [unclear] [unclear] [unclear] [unclear]	MI	[unclear] [unclear] [unclear] [unclear]	
Ed. [unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	

FEBRUARY 22, 1955

Wm. [unclear] [unclear]		Wm. [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	D.C.	A. [unclear] [unclear] [unclear] [unclear]	Conn
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	Va	Allen [unclear] [unclear]	Miss
[unclear] [unclear] [unclear] [unclear]	MI	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	N.J.	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	Pa	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	Me
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	Ill	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	MI	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	D.C.	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	N.Y.	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	Va	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	MI	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]	N.Y.	[unclear] [unclear] [unclear] [unclear]	Me
[unclear] [unclear] [unclear] [unclear]	MI	[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	
[unclear] [unclear] [unclear] [unclear]		[unclear] [unclear] [unclear] [unclear]	D.C.

Arthur Ewald Newman	Wis.	Allen Aaron Sparling	Md.
B.S. 1934, Memphis State College		A.B. 1946, College of the City of New York	
Walter Frank Nutter	Mo.	Seymour Stahl	D.C.
A.B. 1931, Westminster College, Mo.		B.S. 1949, University of Miami	D.C.
John Seymour O'Brien	D.C.	Robert Louis Seilmar	
Jack For Pitzer	W.Va.	B.E. 1930, Yale University	Md.
B.S. 1948, West Virginia University		Walter Stolwein	
Edward Joseph Rowland	N.Y.	B.S. 1947, College of the City of New York	D.C.
B.S. 1947, College of the Holy Cross		John H. Stryck	
M.S. 1947, New York State College	Hawaii	B.S. 1944, University of Maryland	Va.
Frederick William Rasmussen		Joseph Green Stover	
A.B. 1946, Yale University	N.Y.	A.B. 1948, Dickinson College	D.C.
Samuel Bennett Rathbun		Robert Edward Strassburg	
B.S. 1946, 1951, The George Washington University	Va.	B.S. 1946, Pennsylvania State University	Calif.
Walter Shelby Schaefer, Jr.		Robert Vernon Watson	
A.B. 1929, The George Washington University	Conn.	A.B. 1929, The George Washington University	Iowa
Harold Shale		Jack William Wagoner	
B.S. 1949, University of Connecticut	D.C.	A.B. 1946, Iowa University of Iowa	
Ed. S. Shattuck		Jack James Webb	
A.B. 1946, New York University		A.B. 1948, University of Kentucky	
B.S. 1947, Columbia University			

BACHELOR OF LAWS IN NATIONAL UNIVERSITY

NOVEMBER 11, 1954

Leah Ida Pines	Ill.	Henry Theodore Kamen	N.Y.
B.S. 1948, 1949, Lincoln University		George Michael Simonstien	Mo.
Howard Wilson Pines	Me.		

FEBRUARY 22, 1955

William Arthur Austin	Wis.	Paul Douglas Johnson	N.M.
B.S. 1947, University of Washington		B.S. 1947, University of Southern California	
John Murray Baskoff	Md.	A.M. 1954, University of Maryland	D.C.
William Norman Beckwith	Me.	David G. R. Beach	
B.S. 1947, University of Maryland		B.S. 1947, Dickinson College	N.C.
George Walter Chappman	Mass.	Donald M. Seelman	Md.
James Joseph Hester		B.S. 1948, North Carolina State College	
A.B. 1947, Mount St. Mary's College	Me.	Lawrence Edward Seelman	
David Lee Heston		B.S. 1947, University of Maryland	

JURIS DOCTOR

JUNE 9, 1954

Yvonne Hild Abrams	Me.	Walter M. Mangan	Fla.
A.B. 1946, The George Washington University		B.S. 1947, University of North Carolina	
John LeRoy Adams, Jr.	Me.	Samuel S. Katz	
A.B. 1947, Yale University		B.S. 1947, University of Michigan	Me.
Francis Joseph Gaudin	Va.	Franklin M. Turner	Ore.
B.S. 1947, Furman University		Turner College	
Richard Joseph Fox	N.C.	William College	
B.S. 1947, College of the Holy Cross		Academy	D.C.
General Eugene Fox, Jr.		Academy	
B.S. 1947, V.M. State Academy		Academy	
Max Joseph Fox	Wash.	Academy	
B.S. 1947, V.M. State Academy		Academy	
Robert Charles Fox	N.C.	Academy	
B.S. 1947, V.M. State Academy		Academy	
Robert Charles Fox		Academy	
B.S. 1947, V.M. State Academy		Academy	
Robert Charles Fox		Academy	
B.S. 1947, V.M. State Academy		Academy	

NOVEMBER 11, 1954

Joseph John Kelly B.S. 1949, Ohio State University	Va.	Howard Arthur Thomas A.B. 1946, Furman University	Va.
Harold Russell Palmer A.B. 1948, Smith College	Ky.	Thomson Paul and Tyne B.S. 1941, University of Maryland	MD
Sam Anderson B.S. 1948, Furman College of the Citadel, New York	N.Y.	John Paul Wilson A.B. 1948, Washington College	MD

FEBRUARY 22, 1955

George Lusk, Jr. B.A. 1948, Western Reserve	W.Va.	Marion Lee Smith B.S. 1941, University of Pennsylvania	Pa.
John A. Williams, Esq. A.B. 1948, University of Illinois	Va.	Richard Keith Wain B.S. 1948, University of Texas	Texas
George Lusk, Jr. A.B. 1941, The George Washington University	D.C.	Norman Lee Wilson B.S. 1948, West Virginia University	N.D.
John William Lusk, Jr. B.S. 1948, West Virginia University	W.Va.		

MASTER OF LAWS

JUNE 9, 1954

Robert Lee Brown LL.B. 1948, University of Texas	Texas	Walter Nicholas Meyer J.D. 1948, A.B. 1941, The George Washington University	N.C.
Lawrence E. Lusk, Jr. LL.B. 1948, University of Texas	Mo.	Marion Lee Smith B.S. 1941, University of Pennsylvania	N.Y.
William E. Lusk, Jr. LL.B. 1948, University of Texas	N.J.	John Paul Wilson A.B. 1948, Washington College	Ind.
William E. Lusk, Jr. LL.B. 1948, University of Texas	Ala.	Francis Marion Smith A.B. 1948, Washington College	S.C.
William E. Lusk, Jr. LL.B. 1948, University of Texas	Mo.	Marion Lee Smith B.S. 1941, University of Pennsylvania	Va.
William E. Lusk, Jr. LL.B. 1948, University of Texas	N.Y.	Norman Lee Wilson B.S. 1948, West Virginia University	Ill.
William E. Lusk, Jr. LL.B. 1948, University of Texas	Mo.	John Paul Wilson A.B. 1948, Washington College	Calif.
William E. Lusk, Jr. LL.B. 1948, University of Texas	Calif.	LL.B. 1948, The George Washington University	

FEBRUARY 22, 1955

Lawrence E. Lusk, Jr. LL.B. 1948, University of Texas	Pa.	High School Graduate A.B. 1941, The George Washington University	Mo.
Lawrence E. Lusk, Jr. LL.B. 1948, University of Texas	Va.	Marion Lee Smith B.S. 1941, University of Pennsylvania	Pa.
Lawrence E. Lusk, Jr. LL.B. 1948, University of Texas	Texas	John Paul Wilson A.B. 1948, Washington College	Ind.
Lawrence E. Lusk, Jr. LL.B. 1948, University of Texas	Pa.	LL.B. 1948, The George Washington University	

FEBRUARY 22, 1955

MASTER OF COMPARATIVE LAW

JUN 9, 1954

Herwig Götz
Dipl.-Ing. 1982, University of
Dortmund, Germany

NOVEMBER 11, 1954

Received: 15 June 2016
 Accepted: 12 July 2016
 Published: 19 July 2016

FEBRUARY 22, 1955

Dr. T. S. 1947 University of Virginia

MASTER OF COMPARATIVE LAW (American Practice)

JUN 9, 1954

[illegible]

FEBRUARY 22, 1955

Yves-Jean de Larosière
Director, Department of Economic
Policy, Luxembourg

Ilse
Agneta B. van
Middelburg, 1974, Institute of
Economic
Economics, 1974, INRA University
Maastricht, Netherlands

DOCTOR OF JURIDICAL SCIENCE

JUN 9, 1954

Philip Levine B.E.A., College of the City of New York H.E. 1939, Columbia University H.M. 1941, New York University Dissertation: "The Evolution of the Free Market System and the Free Market System of the Free Market System of the Free Market System of the	N.Y. W. 1939, Columbia University A.B. 1941, Columbia University H.E. 1943, Columbia University H.M. 1945, Columbia University Dissertation: "The Evolution of the Free Market System and the Free Market System of the Free Market System of the
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The Law School

53

Time	Topic	Speaker
9:00 AM	Law School Open House	Prof. Walter Wines
10:00 AM	Law School Open House	Prof. Walter Wines
11:00 AM	Law School Open House	Prof. Walter Wines
12:00 PM	Law School Open House	Prof. Walter Wines
1:00 PM	Law School Open House	Prof. Walter Wines
2:00 PM	Law School Open House	Prof. Walter Wines
3:00 PM	Law School Open House	Prof. Walter Wines
4:00 PM	Law School Open House	Prof. Walter Wines
5:00 PM	Law School Open House	Prof. Walter Wines
6:00 PM	Law School Open House	Prof. Walter Wines
7:00 PM	Law School Open House	Prof. Walter Wines
8:00 PM	Law School Open House	Prof. Walter Wines
9:00 PM	Law School Open House	Prof. Walter Wines

FEBRUARY 22, 1955

Harvard Law School
 100 Longwood Avenue
 Cambridge, Mass. 02138
 N.Y.

SUMMER TERM 1954
FALL AND SPRING TERMS 1954-55

(54)

[illegible]

[illegible]

Frederick, Thomas Rufus	D.C.	Frost, Thomas James III	Calif.
B.S. 1914, A. 1919, Boston University		A.B. 1917, Dartmouth College	D.C.
Frost, Percy	D.C.	Trotter, Hubert	
A.B. 1911, Williams University		B.C.E. 1911, College of Education of	
L.L.B. 1919, Harvard University		New York	
Frost, Robert Anthony	N.Y.	Trotter, Thomas Russell	
A.B. 1915, St. John's University		B.M.E. 1917, Central University	
L.L.B. 1919, Georgetown University		1917, Chicago	
Frost, Paul Harold	Texas	Trotter, William Swann	
A.F. 1914, Cleveland Public College		A.F. 1914, The George Washington	
Frost, William Richard	D.C.	University	
A.B. 1914, Quinn College		A.M. 1918, Catholic University of	
Frost, Charles Joseph	D.C.	America	
L.L.B. 1917, West Virginia University		Frost, John August	Pa.
Frost, Thomas Henry	Ill.	A.B. 1914, University of Maryland	
B.S. in M.E. 1917, University of		Edw. A. (1914)	
North Dakota		A.B. 1917, University of Maryland	
Frost, Alexander Raymond	D.C.	Frost, John Thomas	
B.S. in Agr. E. 1912, University of		A.B. 1914, Washington University	
Michigan		Frost, John	
Frost, William Thomas	Md.	Frost, John August	
B.E. 1917, M.E. 1918, Johns Hopkins		A.B. 1914, University of Virginia	
University		Frost, Daniel Ross	
L.L.B. 1914, M.B.A. 1916, Temple		B.S. 1917, University of Texas	
University		Frost, John	
H.M. 1917, The George Washington		A.B. 1914, University of Michigan	
University		Frost, Roy Donald	
Frost, John Verne	D.C.	B.S. in C.E. 1917, University of	
A.B. 1914, L.L.B. 1917, The George		Texas	
Washington University		Frost, Richard Paul	
Frost, John Louis	Ill.	A.B. 1917, Yale University	
B.S. 1917, L.L.B. 1917, Georgetown		Frost, John M. Jr.	
University		B.S. 1917, St. Joseph's College	
Frost, Stanley Alfred	D.C.	Frost, Richard Allen	
B.S.A. 1917, University of Miami		A.B. 1914, University of Chicago	
Frost, Thomas William	Ky.	A.P. 1917, The George Washington	
A.B. 1911, Knox College		University	
Frost, William Dugan	Md.	Frost, James Harold J. Jr.	
A.B. 1917, University of Richmond		A.B. 1917, West Virginia University	
Frost, Paul	Pa.	Frost, Steven	
B.E. 1917, Donald Institute of		A.B. 1917, Holy Cross University	
Washington		H.B. 1917, St. John's University	
Frost, John Thomas	D.C.	L.L.M. 1914, Catholic University of	
H.D. 1911, University of Prague,		America	
Czechoslovakia		Frost, Alexander Frank	
M.C.E. 1917, The George Washington		B.S. 1917, Florida State University	
University		Frost, Richard	
Frost, Nathan Cheney	Mass.	B.C.E. 1917, College of the City of	
A.B. 1917, Amherst College		New York	
L.L.B. 1918, Harvard University		A.M. 1917, Columbia University	
Frost, Vernon Charles	Ark.	Frost, John Philip	
Frost, Alfred Cheney	D.C.	A.B. 1917, Wellesley College	
B.S. 1917, Wilson Teachers College		Frost, William	
Frost, Myron Carl	Md.	A.B. 1917, University of Puerto Rico	
A.F. 1914, Western Maryland College			
A.M. 1918, L.L.D. 1922, Columbia			
University			
B.D. 1917, New York University			
Frost, Robert George	Pa.	Gardner, James Xavier, Jr.	
A.F. 1914, Pennsylvania State		A.B. 1917, The George	
University		Washington University	
Frost, Paul Jay	Pa.	Gardner, Raymond	
A.B. 1917, Lebanon Valley College		A.B. 1917, Pennsylvania State	
Frost, George Joseph, Jr.	Md.	University	
M.B. 1917, University of Minnesota		Gardner, Charles John	
Frost, William John	Fla.	A.B. 1917, University of Buffalo	
A.B. 1917, The George Washington		Gardner, William	
University		Gardner, Robert William	
Frost, Robert Carl	D.C.	A.B. 1917, University of Virginia	
A.B. 1917, The George		Gardner, John Francis	
Washington University		A.B. 1917, The George	
Frost, John Anthony	Puerto Rico	Washington University	
A.B. 1917, University of Maryland		Gardner, William George	
		B.S. 1917, Union College	

Griesemer, Herman David	Md.	Hansen, William Joseph	D.C.
A.B. 1942, University of North Carolina		B.M.E. 1946, The George Washington University	
Groves, Benjamin Franklin	Va.	Hartman, Louis Paul	Va.
B.S. 1941, University of Virginia		B.S. 1944, Georgetown University	
Groves, John Douglas, Jr.	Conn.	Harris, Edward Bruce	
B.S. 1942, Yale University		B.S. 1942, University of South Carolina	
Groves, John A.	Ky.	Hartman, Thomas Joseph	
A.B. 1941, University of North Carolina		A.B. 1942, Western Md. Mary's College	
Groves, William Joseph	Va.	Hartman, Thomas Joseph	
A.B. 1941, The George Washington University		A.B. 1942, A.M. 1943, Florida State University	
Groves, Charles Vincent	Va.	Hartman, John H.	
B.S. 1942, LL.B. 1943, Boston University		A.B. 1942, Washington University	
Groves, Francis Leslie	Me.	Hartman, David Lee	
B.S. 1942, LL.B. 1943, University of Minnesota		Hartman, Francis Boone	
Groves, Paul J. Paul	D.C.	A.B. 1942, University of Maryland	
B.S. 1942, Miami University		Hartman, George Samuel	
Groves, Edward George	Ind.	B.S. 1942, Virginia Military Institute	
B.S. 1942, M.S. 1943, Purdue University		Hartman, Joseph Lewis, Jr.	
Dr. en Droit 1943, University of Lyon, France		A.B. 1944, University of Delaware	
LL.B. 1944, The George Washington University		Hartman, James Lee, Jr.	
Groves, Harry Joseph, Jr.	D.C.	B.S. 1942, U.S. Naval Academy	
A.B. 1942, St. Vincent College		Hartman, John	
Groves, John Joseph	D.C.	B.A. 1942, College of the City of New York	
A.B. 1942, University of Kansas		Hartman, John H.	
Groves, John K.	D.C.	A.B. 1942, The George Washington University	
A.B. 1942, The George Washington University		Hartman, Joseph Norman, Jr.	
Groves, William Joseph, Jr.	Mass.	B.S. 1942, Northwestern University	
A.B. 1942, The George Washington University		Hartman, Joseph H.	
Groves, Philip Allen	Pa.	A.B. 1942, University of Virginia	
A.B. 1942, Georgetown College		LL.B. 1944, The George Washington University	
Groves, John William	Iowa	Hartman, John Coleman, Jr.	
A.B. 1944, State University of Iowa		Hartman, Thomas E.	
H			
Haberler, Thomas Benjamin	Me.	Hartman, Thomas E.	
B.S. 1942, Massachusetts Institute of Technology		B.S. 1942, M.S. 1943, University of Maryland	
Haber, John Anderson	N.Y.	Hartman, John Beeman	
A.B. 1942, Ithaca and Elkins College		B.S. 1942, M.S. 1943, University of Maryland	
Haber, Harvey Robert	N.Y.	Hartman, John Beeman	
A.B. 1942, State University of Iowa		B.S. 1942, M.S. 1943, University of Maryland	
Haber, Walter George	Conn.	Hartman, John Beeman	
A.B. 1942, The George Washington University		B.S. 1942, M.S. 1943, University of Maryland	
Hall, James Ray	W.Va.	Hartman, John Beeman	
B.S. 1942, West Virginia University		B.S. 1942, M.S. 1943, University of Maryland	
Hall, Leon Van derbilt	Ga.	Hartman, John Beeman	
A.B. 1942, Morehouse College		B.S. 1942, M.S. 1943, University of Maryland	
Hall, Charles White	Ind.	Hartman, John Beeman	
A.B. 1942, Williams College		B.S. 1942, M.S. 1943, University of Maryland	
Hall, John Thomas	Va.	Hartman, John Beeman	
Hall, John Thomas	Hawaii	Hartman, John Beeman	
A.B. 1942, University of Hawaii		B.S. 1942, M.S. 1943, University of Maryland	
Hall, James Andrew	Iowa	Hartman, John Beeman	
A.B. 1942, Morehouse College		B.S. 1942, M.S. 1943, University of Maryland	
Hall, James Andrew	D.C.	Hartman, John Beeman	
A.B. 1942, College of the Holy Cross		B.S. 1942, M.S. 1943, University of Maryland	
Hall, Lloyd William	Va.	Hartman, John Beeman	
A.B. 1942, LL.B. 1943, The George Washington University		B.S. 1942, M.S. 1943, University of Maryland	
Hall, Thomas M.	D.C.	Hartman, John Beeman	
B.S. 1942, University of Pittsburgh		B.S. 1942, M.S. 1943, University of Maryland	

[illegible]

Kennedy, Henry Russell J. B. 1911, University of Minnesota	Nev.	Kerr, Arthur Mervin A.B. 1911, The George Washington University	Mont.
Kerr, Henry Russell J. B. 1911, University of Minnesota	Id.	Kerr, Philip Edgdon B.S. in M.E. 1912, University of Maryland	W. Va.
Kerr, Henry Russell J. B. 1911, University of Minnesota	N.Y.		Id.
Kerr, Henry Russell J. B. 1911, University of Minnesota	D.C.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	D.C.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Mass.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Mich.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	D.C.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Pa.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Mich.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Va.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Pa.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Ind.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Va.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Va.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	N.Y.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	D.C.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Calif.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Pa.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Pa.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Formosa		
Kerr, Henry Russell J. B. 1911, University of Minnesota	D.C.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Va.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Pa.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	D.C.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Mich.		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Texas		
Kerr, Henry Russell J. B. 1911, University of Minnesota	Ohio		

[illegible]

College	State	Year	Notes	Grade
College of William & Mary	Virginia	1779	First	D.C.
College of William & Mary	Virginia	1779	Second	D.C.
College of William & Mary	Virginia	1779	Third	D.C.
College of William & Mary	Virginia	1779	Fourth	D.C.
College of William & Mary	Virginia	1779	Fifth	D.C.
College of William & Mary	Virginia	1779	Sixth	D.C.
College of William & Mary	Virginia	1779	Seventh	D.C.
College of William & Mary	Virginia	1779	Eighth	D.C.
College of William & Mary	Virginia	1779	Ninth	D.C.
College of William & Mary	Virginia	1779	Tenth	D.C.
College of William & Mary	Virginia	1779	Eleventh	D.C.
College of William & Mary	Virginia	1779	Twelfth	D.C.
College of William & Mary	Virginia	1779	Thirteenth	D.C.
College of William & Mary	Virginia	1779	Fourteenth	D.C.
College of William & Mary	Virginia	1779	Fifteenth	D.C.
College of William & Mary	Virginia	1779	Sixteenth	D.C.
College of William & Mary	Virginia	1779	Seventeenth	D.C.
College of William & Mary	Virginia	1779	Eighteenth	D.C.
College of William & Mary	Virginia	1779	Nineteenth	D.C.
College of William & Mary	Virginia	1779	Twentieth	D.C.
College of William & Mary	Virginia	1779	Twenty-first	D.C.
College of William & Mary	Virginia	1779	Twenty-second	D.C.
College of William & Mary	Virginia	1779	Twenty-third	D.C.
College of William & Mary	Virginia	1779	Twenty-fourth	D.C.
College of William & Mary	Virginia	1779	Twenty-fifth	D.C.
College of William & Mary	Virginia	1779	Twenty-sixth	D.C.
College of William & Mary	Virginia	1779	Twenty-seventh	D.C.
College of William & Mary	Virginia	1779	Twenty-eighth	D.C.
College of William & Mary	Virginia	1779	Twenty-ninth	D.C.
College of William & Mary	Virginia	1779	Thirtieth	D.C.
College of William & Mary	Virginia	1779	Thirty-first	D.C.
College of William & Mary	Virginia	1779	Thirty-second	D.C.
College of William & Mary	Virginia	1779	Thirty-third	D.C.
College of William & Mary	Virginia	1779	Thirty-fourth	D.C.
College of William & Mary	Virginia	1779	Thirty-fifth	D.C.
College of William & Mary	Virginia	1779	Thirty-sixth	D.C.
College of William & Mary	Virginia	1779	Thirty-seventh	D.C.
College of William & Mary	Virginia	1779	Thirty-eighth	D.C.
College of William & Mary	Virginia	1779	Thirty-ninth	D.C.
College of William & Mary	Virginia	1779	Fortieth	D.C.
College of William & Mary	Virginia	1779	Forty-first	D.C.
College of William & Mary	Virginia	1779	Forty-second	D.C.
College of William & Mary	Virginia	1779	Forty-third	D.C.
College of William & Mary	Virginia	1779	Forty-fourth	D.C.
College of William & Mary	Virginia	1779	Forty-fifth	D.C.
College of William & Mary	Virginia	1779	Forty-sixth	D.C.
College of William & Mary	Virginia	1779	Forty-seventh	D.C.
College of William & Mary	Virginia	1779	Forty-eighth	D.C.
College of William & Mary	Virginia	1779	Forty-ninth	D.C.
College of William & Mary	Virginia	1779	Fiftieth	D.C.

Polge, Jack P.	W.Va.	Reynolds, Daniel Joseph	
B.S. 1941, West Virginia University		B.S. 1943, College of the Holy Cross	
Polson, James Joseph	N.Y.	M.S. 1941, New York State College	
B.S. 1939, Cornell University			
Polson, William	Conn.	Reynolds, David Emerson	
A.B. 1941, University of Connecticut		B.S. 1941, Connecticut College	
Polson, Robert Joseph	Nev.	Reynolds, John C., Jr.	
A.B. 1941, University of Nevada		B.S. 1941, The George Washington	
Polson, Stanley	Va.		
B.S.E. 1940, M.C.E. 1942, College of		Reynolds, James Daniel	
the City of New York		A.B. 1941, The George Washington	
Polson, James Thomas	Mass.		
A.B. 1941, Amherst College		Reynolds, William	
Polson, Herbert	N.Y.	B.S. 1941, Wabash College	
A.B. 1941, Cornell University		Reynolds, William	
Polson, Samuel Hall	Md.	B.S. 1941, Temple University	
B.S. 1941, University of Maryland		Reynolds, Stanley	
Polson, James C.	Mass.	A.B. 1941, Franklin and Marshall	
A.B. 1941, Tufts College			
Polson, George William	D.C.	Rice, Melvin	
B.S. 1941, Deere Institute of		B.S. 1941, Virginia Institute of	
Technology		Rice, John Andrew, Jr.	
Polson, Frank D. Goodfield	R.I.	B.S. 1941, University of Maryland	
B.S. 1941, University of Florida		Rice, Samuel Y.	
Polson, Thomas	Md.	A.B. 1941, The George Washington	
A.B. 1941, University of Memphis			
A.M. 1941, The George Washington		Rice, Mark Edwin, Jr.	
University		A.B. 1941, Western State College of	
Polson, Thomas Hardy III	Ark.		
Polson, Eric William	Va.	Rice, Robert Morton	
A.B. 1941, Dickinson College		B.S. 1941, Middle College	
Polson, Herbert Russell	Ky.	Rice, Samuel	
A.B. 1941, Dickinson College		Rice, William	
J.D. 1944, The George Washington		Rice, Vali	
University		Ph.D. 1942, University of	
Polson, Leroy Andrew	Md.	Texas, Estonia	
B.S. 1941, University of Virginia		Rice, Adel Vaino	
		B.S. 1941, University of Tartu,	
		Rice, Virginia Lee	
		B.S. 1940, National University	
		Rice, Glenn	
		A.B. 1941, University of Colorado	
		Rice, Anne	
		A.B. 1941, The George Washington	
		Rice, George	
		B.S. 1941, The George Washington	
		Rice, Max	
		A.B. 1941, The George Washington	
		Rice, Howard	
		B.S. 1941, The City of	
		Rice, Edward, Jr.	
		B.S. 1941, Rose-Hulman Polytch.	
		Rice, The George Washington	
		Rice, William	
		B.S. 1941, University of Pennsylvania	
		Rice, Spencer Everett	
		B.S. 1941, U.S. Naval Academy	
		Rice, William Donald	
		B.S. 1941, The George Washington	
		Rice, Howard Stone	
		B.S. 1941, Purdue University	
		Rice, Augustus	
		B.S. 1941, University of Virginia	

Schlesinger, Roy Ramon, Jr. B.S. 1952, The George Washington University	Va	Shanklin, Lay Edwin A.B. 1952, Washburn Memorial University of Topeka	Mo
Schmitt, Richard Frederick B.S. 1950, University of Southern California M.S. 1951, The George Washington University	D.C.	Shaw, Ramon P. B.S. 1943, LL.B. 1951, Georgetown University	Mo
Schmitt, Charles Andrew B.S. 1942, University of Utah	Utah	Shaw, Frank Stanley A.B. 1945, Bryn Mawr College	N.Y.
Schmitt, Herbert A.B. 1945, The George Washington University	N.Y.	Shaw, John Howard A.B. 1946, Princeton University	Pa.
Schmitt, A.M. 1947, University of Michigan		Shaw, James A.B. 1944, Bowdoin College	Me.
Schmitt, Richard Henry A.B. 1945, The George Washington University	Va	Shaw, Robert Neil A.B. 1944, Catholic University of America	Va.
Schmitt, M.B.A. 1952, Rutgers University		Shaw, John Howard III A.B. 1944, Williams College	Mass.
Schmitt, Joseph Isaac B.S. 1950, Wilson Teachers College	D.C.	Shaw, John A.B. 1942, University of Hawaii	Pa.
Schmitt, Claude Marion A.B. 1944, The George Washington University	Calif.	Shaw, Robert B.S. 1948, College of the Holy Cross	Pa.
Schmitt, Russell Thomas A.B. 1944, University of Nevada	Nev.	Shaw, David B.S. 1944, Pennsylvania State University	Pa.
Schmitt, Harry A.B. 1944, The George Washington University	D.C.	Shaw, John Lee B.S. 1944, The George Washington University	Pa.
Schmitt, Franklin I. B.S. 1948, U.S. Naval Academy M.B.A. 1949, Harvard University	Va	Shaw, Charles Peter, Jr. A.B. 1944, Trinity College	Pa.
Schmitt, Margaret Elizabeth A.B. 1945, The George Washington University	D.C.	Shaw, John B.S. 1946, Cornell University	Mass.
Schmitt, Ed B.S. 1948, College of the City of New York	N.Y.	Shaw, Robert A.B. 1944, Johns Hopkins University	Va.
Schmitt, Helen Frances A.B. 1944, Ford College		Shaw, Robert A.B. 1944, University of Virginia	Pa.
Schmitt, Lawrence Paul B.S. 1948, Southern University		Shaw, John A.B. 1944, New York University	N.Y.
Schmitt, Albert William B.S. 1948, Washington University M.S. 1950, University of New Hampshire	D.C.	Shaw, John B.S. 1944, University of Maryland	N.Y.
Schmitt, Paul William A.B. 1944, Southeast Missouri State College	Mo	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, Jane William A.B. 1944, Harvard University	Me.	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, Edwin Howard A.B. 1944, A.M. 1945, Johns Hopkins University	Me.	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, Bruce Jeffrey A.B. 1944, The George Washington University	D.C.	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, Donald Milton B.S. 1948, North Carolina State Teachers College	N.C.	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, John A.B. 1944, Govt. 1945, LL.B. 1946, The George Washington University	Me.	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, John Milton A.B. 1944, Pennsylvania College of Law	Oriz.	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, Hugh Madison, Jr. A.B. 1944, University of Maryland	Va	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, Harold B.S. 1944, University of Connecticut	Conn.	Shaw, John B.S. 1944, University of Maryland	Pa.
Schmitt, Everett Monroe A.B. 1944, The George Washington University	D.C.	Shaw, John B.S. 1944, University of Maryland	Pa.

State	Name	Year	Address	City	State
Ala.	Donald Joseph	1944	University of Alabama	Tuscaloosa	Ala.
Ariz.	James K. K. K.	1944	University of Arizona	Tucson	Ariz.
Calif.	James K. K. K.	1944	University of California	Berkeley	Calif.
Conn.	James K. K. K.	1944	University of Connecticut	New Haven	Conn.
Del.	James K. K. K.	1944	University of Delaware	Dover	Del.
Fla.	James K. K. K.	1944	University of Florida	Gainesville	Fla.
Ill.	James K. K. K.	1944	University of Illinois	Urbana	Ill.
Ind.	James K. K. K.	1944	University of Indiana	Bloomington	Ind.
Iowa	James K. K. K.	1944	University of Iowa	Iowa City	Iowa
Kent.	James K. K. K.	1944	University of Kentucky	Lexington	Kent.
La.	James K. K. K.	1944	University of Louisiana	Baton Rouge	La.
Maine	James K. K. K.	1944	University of Maine	Orono	Maine
Maryland	James K. K. K.	1944	University of Maryland	College Park	Maryland
Mass.	James K. K. K.	1944	University of Massachusetts	Amherst	Mass.
Mich.	James K. K. K.	1944	University of Michigan	Ann Arbor	Mich.
Minn.	James K. K. K.	1944	University of Minnesota	Minneapolis	Minn.
Miss.	James K. K. K.	1944	University of Mississippi	Oxford	Miss.
Mo.	James K. K. K.	1944	University of Missouri	Columbia	Mo.
Mont.	James K. K. K.	1944	University of Montana	Helena	Mont.
Nebr.	James K. K. K.	1944	University of Nebraska	Lincoln	Nebr.
Nev.	James K. K. K.	1944	University of Nevada	Reno	Nev.
N.H.	James K. K. K.	1944	University of New Hampshire	Durham	N.H.
N.J.	James K. K. K.	1944	University of New Jersey	Camden	N.J.
N.Y.	James K. K. K.	1944	University of New York	Albany	N.Y.
N.C.	James K. K. K.	1944	University of North Carolina	Chapel Hill	N.C.
N.D.	James K. K. K.	1944	University of North Dakota	Grand Forks	N.D.
Ohio	James K. K. K.	1944	University of Ohio	Columbus	Ohio
Ore.	James K. K. K.	1944	University of Oregon	Eugene	Ore.
Penn.	James K. K. K.	1944	University of Pennsylvania	Philadelphia	Penn.
R.I.	James K. K. K.	1944	University of Rhode Island	Providence	R.I.
S.C.	James K. K. K.	1944	University of South Carolina	Columbia	S.C.
S.D.	James K. K. K.	1944	University of South Dakota	Sioux Falls	S.D.
Tenn.	James K. K. K.	1944	University of Tennessee	Knoxville	Tenn.
Texas	James K. K. K.	1944	University of Texas	Austin	Texas
Va.	James K. K. K.	1944	University of Virginia	Charlottesville	Va.
Wash.	James K. K. K.	1944	University of Washington	Seattle	Wash.
W.Va.	James K. K. K.	1944	University of West Virginia	Morgantown	W.Va.
Wis.	James K. K. K.	1944	University of Wisconsin	Madison	Wis.
Wyo.	James K. K. K.	1944	University of Wyoming	Laramie	Wyo.

Strander, William Michael B.S. 1917, Allegheny College B.S. 1912, Carnegie Technical Institute	Pa.	Tessier, Louis Foster A.B. 1929, University of Minnesota B.S. 1929, University of Wisconsin	Minn.
Stearns, Peter Arden A.B. 1929, Allegheny College	D.C.	Thompson, Richard Norman A.B. 1929, Dartmouth College A.M. 1931, Johns Hopkins University	N.H.
Stevens, Louis Franklin A.B. 1914, Yale University	Va.	Thompson, Robert A. Jr. B.S. 1929, Westminster College M.A. 1931, Westminster University	Mo.
Stewart, Louis of Wales B.S. 1915, The George Washington University	MD	Tolson, Paul Henry A.B. 1929, Cornell University	Va.
Stewart, Vincent Henry B.S. 1919, Boston College	Va.	Tompson, Robert M. B.S. 1929, University of California at Los Angeles	Calif.
Sweeting Robert M. A.B. 1941, University of Illinois Niles, Ira D., Jr. B.S. 1934, University of Maryland	Puerto Rico Va.	Towner, William B.S. 1929, Minnesota Academy Towner, William B.S. 1929, Connecticut University	Va. Conn.
T		Turner, Clarence B.B.A. 1943, New York University Turn, Robert Augustus, Jr. A.B. 1951, The George Washington University	N.Y. Va.
Tadler, Hans A.B. 1943, The George Washington University		Trapp, Richard Gordon A.B. 1952, University of New Hampshire	Mich.
Takaka, Eugene William A.B. 1929, University of California at Los Angeles	Calif.	Trotter, Gerald A.B. 1931, Wayne University	Va.
Tall, H. B. B.S. 1925, LL.M. 1934, The George Washington University	Utah	Trotter, Samuel B.S. 1929, College of the City of New York	
Talbot, Edward Milton B.S. 1916, University of Utah	D.C.	Truitt, John M.A. 1931, New York University Truitt, Robert B.S. 1929, The George Washington University	N.Y. Va.
Talbot, William Howard A.B. 1934, Antioch College	Va.	Tully, John Tura, James Vincent B.S. 1952, Ohio State University	Ohio D.C.
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Turcotte, Charles Louis A.B. in Govt. 1951, The George Washington University	
Tall, H. B. B.S. 1925, LL.M. 1934, The George Washington University	I.C.	Tupper, Mary Johnston A.B. 1951, The George Washington University	Maine
Talbot, Edward Milton B.S. 1916, University of Utah	Va.	Tupper, Warren Jewett B.S. in Ed. 1948, University of Maine	Fla.
Talbot, William Howard A.B. 1934, Antioch College	D.C.	Tupper, William Hampton B.S. 1954, Florida State University	Fla.
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana	Va.	Tupper, Thomas Edward B.S. 1951, University of Maryland	MD
Talbot, Edward Milton B.S. 1916, University of Utah	W.Va.	U	
Talbot, William Howard A.B. 1934, Antioch College	M.	Ujevich, Robert Matthew A.B. 1950, Duquesne University	N.Y.
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana	Md.	Urestead, Walter Williams A.B. 1951, University of North Carolina	Pa.
Talbot, Edward Milton B.S. 1916, University of Utah	Pa.	Urestead, Walter Williams A.B. 1951, University of North Carolina	Pa.
Talbot, William Howard A.B. 1934, Antioch College	W.Va.	Urestead, Walter Williams A.B. 1951, University of North Carolina	W.Va.
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana	Md.	Urestead, Walter Williams A.B. 1951, University of North Carolina	Md.
Talbot, Edward Milton B.S. 1916, University of Utah	Va.	Urestead, Walter Williams A.B. 1951, University of North Carolina	Va.
Talbot, William Howard A.B. 1934, Antioch College	D.C.	Urestead, Walter Williams A.B. 1951, University of North Carolina	D.C.
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Tamm, James Madison A.B. 1928, Northwestern State College of Louisiana		Urestead, Walter Williams A.B. 1951, University of North Carolina	
Talbot, Edward Milton B.S. 1916, University of Utah		Urestead, Walter Williams A.B. 1951, University of North Carolina	
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Talbot, William Howard A.B. 1934, Antioch College		Urestead, Walter Williams A.B. 1951, University	

Waver, James Rufus	Alaska	Watt, William Neal	Al
B.S. 1927, Stanford University		B.S. 1929, University of Maryland	W Va
Waxman, Mark Jerome	Va	Watt, John Channing	Pa
Waxman, Thomas Everett	Md	A.B. 1928, Howard College	
A.B. 1924, Towson Missionary		Watt, Thomas Rawlin	Ala
College		A.B. 1921, Washington College	
Waxman, Neil Earl, Jr.	N D	Watt, Robert Ann	
B.S. 1942, U.S. Coast Guard Academy		A.B. 1928, Mt. Holyoke College	
Waxman, William Arthur	Va		
A.B. 1929, Lawrence College			
D.B. 1931, University of Wisconsin			
Waxman, Leslie F., Jr.	Ind	Yack, Albert	Pa
B.S. 1924, Bible Protestant Institute		A.B. 1929, York College	
Wax, John Oswald	N J	Yack, Charles Edgar	
B.S. 1924, University of Virginia		B.E. 1928, Transylvania State	
Wax, Gerard Allen	W Va	Yack, John	
B.M.E. 1911, Georgia Institute of		Yeaman, Adeline Yarnall	
Technology		University	
Wax, Charles Rufus	Mo	A.B. 1929, York College	
A.B. 1924, University of Maryland		Yack, Robert John	
Wax, Francis James	Md	A.B. 1929, University of North	
B.A. 1922, Virginia College		Carolina	
Wax, Gene Morton	Va	Yack, John	
B.S. 1927, North Texas State Teachers		Yack, Thomas Woodard	
College		B.M.E. 1929, University of Arizona	
Wax, Paul Gene, Jr.	Md	Yack, Robert Warren	
A.B. 1929, University of Maryland		A.B. 1928, New Jersey State Teachers	
Waxman, Alan Francis	Md	College	
A.B. 1925, Queen's University		A.M. 1928, Rutgers University	
Wax, Robert D., Jr.	W	J.D. 1929, Johns Hopkins University	
A.B. 1919, Yale University			
A.M. 1924, Johns Hopkins University			
Wax, C. Lawrence	Mo	Zach, John	Pa
B.S. 1929, University of Maryland		J.E.M. 1929, John Keenan University	
Wax, John Oliver, Jr.	Pa	Poland	
B.E. 1919, University of Texas		Zach, John	
Waxman, Thomas James	Md	B.E. 1929, West Virginia University	
A.B. 1929, Johns Hopkins		Zach, Robert Franklin	
Wax, Earl James	W	B.E. 1929, Ag. Mgmt. College of	
B.S. 1928, Brigham Young University		Mississippi Ind. Technology	
Wax, Charles Robert	Pa	Zach, John	
B.S. 1926, American University		B.S. 1929, University of	
Wax, John Eugene	Va	California	
L.L.B. 1929, The George Washington		Zach, Robert Franklin	
University		J.E.M. 1929, Pennsylvania State	
Wax, David William	N Y	University	
B.S. 1924, U.S. Coast Guard Academy		Zach, Mary Jane	
Waxman, Howard Hampton	Md	A.B. 1929, University of Wa	
B.S. 1921, University of Minnesota		University	
Wax, David Philip	Md	Zach, Albert	
B.M.E. 1929, Purdue University		B.M.E. 1929, Purdue University	

SUMMARIES OF REGISTRATION

SUMMER TERM 1954

FALL AND SPRING TERMS 1954-55

GEOGRAPHICAL DISTRIBUTION OF STUDENTS

UNITED STATES: Teachers and Principals

GENERAL DISTRIBUTION OF STUDENTS			
United States, Territories, and Possessions			
Alabama	9	North Carolina	17
Alaska	5	North Dakota	2
Arizona	22	Oklahoma	1
Arkansas	10	Oregon	1
California	10	Oregon	1
Colorado	2	Pennsylvania	107
Connecticut	281	Rhode Island	4
Delaware	17	South Carolina	12
District of Columbia	5	South Dakota	1
Florida	4	Tennessee	1
Georgia	19	Texas	11
Idaho	13	Utah	12
Illinois	8	Vermont	2
Indiana	8	Vermont	108
Iowa	9	Washington	5
Kansas	3	West Virginia	22
Kentucky	4	Wyoming	1
Louisiana	285	Wyoming	8
Maine	21	Alaska	1
Maryland	4	Colorado	1
Massachusetts	17	Idaho	1
Michigan	2	Illinois	1
Minnesota	15	Indiana	1
Mississippi	4	Iowa	1
Missouri	2	Kansas	1
Montana	15	Kentucky	1
Nebraska	4	Louisiana	1
Nevada	2	Maine	1
New Hampshire	2	Maryland	1
New Jersey	2	Massachusetts	1
New Mexico	21	Michigan	1
New York	4	Minnesota	1
	85	Mississippi	1
		Montana	1
		Nebraska	1
		Nevada	1
		New Hampshire	1
		New Jersey	1
		New Mexico	1
		New York	1
			1

GRADUATES OF COLLEGES REGISTERED IN THE LAW SCHOOL

LIST OF COLLEGES REGISTERED IN THE LAW SCHOOL		
1	Alabama College	1
2	Alabama Polytechnic Institute	2
3	Alabama State Teachers College	3
4	Alabama University of	4
5	Alabama University of	5
6	Alabama University of	6
7	Alabama University of	7
8	Alabama University of	8
9	Alabama University of	9
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98	Alabama University of	98
99	Alabama University of	99
100	Alabama University of	100

Bowdoin College	4	Drexel College	
Bowling Green College of Commerce	1	Drexel Institute of Technology	
Bridgeport, University of	1	Duke University	
Bridgewater College	1	Duquesne University	
Brighton Young University	11	East Tennessee State College	
Brooklyn College	6	East Texas College of Law	
Brunswick, Polytechnic Institute of	1	Eastern Missouri College	
Brown University	3	Fairy and Henry College	
Bryn Mawr College	1	Ferris University	
Buena Vista University	1	Ferris, University of Georgia	
Budapest, University of	1	Ferris College	
Buffalo, University of	5	Ferris College of Law and Business	
Cairo, University of, Egypt	1	Ferris Southern College	
California Institute of Technology	2	Ferris State University	
California at Los Angeles		Ferris University	
California, University of	7	Ferris University	
Calvin College	1	Ferris and Marshall College	
Cameron College	1	Ferris University	
Carleton College	1	George Washington University	
Carnegie Institute of Technology	1	The	
Carnegie-National College	1	Georgetown University	
Carnegie Institute of Technology	1	Georgia Institute of Technology	
Carnegie College	1	Georgia, University of	
Carleton University of America	11	Georgetown College	
Central College, Mo.	2	Georgetown College	
Central College	2	Georgetown College of Law	
Charles University		Georgetown University	
Chesham, College of	1	Georgetown College of Law	
Chicago University of	1	Georgetown College of Law	
Chicago, University of	1	Georgetown College of Law	
Chico, Fla.	2	Georgetown College of Law	
Clark University	2	Georgetown College of Law	
Clarkson College of Technology	2	Georgetown College of Law	
Claremont Agricultural College	1	Georgetown College of Law	
Claremont College	2	Georgetown College of Law	
Colorado College	1	Georgetown College of Law	
Colorado State College of Education	1	Georgetown College of Law	
Colorado, University of	6	Georgetown College of Law	
Colombia University	14	Georgetown College of Law	
Commonwealth College	1	Georgetown College of Law	
Commonwealth University of	2	Georgetown College of Law	
Concord College	1	Georgetown College of Law	
Concord Union	3	Georgetown College of Law	
Concord University	10	Georgetown College of Law	
Concord College	8	Georgetown College of Law	
Concord and Elbert College	1	Georgetown College of Law	
Concord University of	5	Georgetown College of Law	
Concord University	2	Georgetown College of Law	
Concord University of	6	Georgetown College of Law	
De Puy University	2	Georgetown College of Law	
Detroit College of Law	1	Georgetown College of Law	

Kalamazoo College	1	Morris-Harvey College	1
Kansas State College of Agriculture and Applied Science	3	Mount Holyoke College	2
Kansas, University of	4	Mount Union College	2
Kentucky, University of	3	Muhlenberg College	4
Knox College	1	Munich, University of, Germany	1
Knox College	1	Muskegon College	1
Kansas, University of	1	Nagasaki, University of, Italy	1
Lafayette College	1	Namur College	1
Lake Forest College	1	National University	6
Lake College	1	Nelumbus, University of	3
Lafayette, University of, Iowa	1	Nevada, University of	4
Lafayette College	1	New Hampshire, University of	8
Lafayette, Vassar College	1	New Jersey State Teachers College, Montclair	2
Lafayette University	4	New Mexico College of Agriculture and Mechanical Arts	1
Lafayette University of	6	New Mexico, University of	1
Lafayette Polytechnic Institute	1	New Mexico, University of the City of	22
Lafayette State University	1	New York College of the City of	1
Lafayette, University of	1	New York Law School	1
Lafayette University	2	New York State College for Teachers	1
Lafayette College	1	New York University	14
Lafayette University of India	1	Niagara University	1
Lafayette University of	4	North Carolina State Teachers College	2
Lafayette College	2	North Carolina, University of	17
Lafayette University	3	Northwestern University	5
Lafayette College	2	North Texas State Teachers College	1
Lafayette University of	73	Northwestern Missouri State College	1
Lafayette University of	4	Northwestern College of Law	1
Lafayette University, Canada	3	Northwestern State College of Law	1
Lafayette College	1	Northwestern University	8
Lafayette State College	2	Notre Dame of Maryland College of	2
Lafayette University	1	Notre Dame University of	2
Lafayette College	1	Occidental College	1
Lafayette University	1	Ohio State University	12
Lafayette University of	2	Ohio Wesleyan University	3
Lafayette College of Medicine and Dentistry	8	Ohio, University of	6
Lafayette College	5	Oklahoma, University of	1
Lafayette University of	2	Oklahoma, University of	6
Lafayette College	17	Oregon, University of	2
Lafayette School of Engineering	1	Paris, University of	2
Lafayette University of	1	Paris, University of France	1
Lafayette State College	10	Pennsylvania Military College	1
Lafayette University of	1	Pennsylvania State Teachers College, East Stroudsburg	2
Lafayette School of Mines	2	Pennsylvania State Teachers College, Philadelphia	1
Lafayette State College	1	Pennsylvania State University	28
Lafayette State University	1	Pennsylvania, University of	11
Lafayette College	1	Pennsylvania, University of	12

Prague, University of		Springfield College	1
Pravoslavna	1	Stanford University	2
Presbyterian College	1	Stevens Institute of Technology	1
Princeton University	12	Swarthmore College	11
Principia College	1	Syracuse University	2
Providence College	3	Tartu, University of, Estonia	7
Puerto Rico, University of	1	Temple University	1
Purdue University	14	Tennessee, University of	1
Queens College	1	Texas Agricultural and	1
Rackham College	3	Medical College	1
Reed College	1	Texas, University of	1
Rensselaer Polytechnic Institute	5	Thames Valley University of	2
Rhode Island, University of	1	Thailand	1
Rhodes, University of	8	Thiel College	1
Rider College	1	Tokyo University, Japan	1
Roberts College	1	Tokyo, University of	1
Rollins College	1	Tientsin College	1
Rutgers University	1	Tri-State College	2
Royal College of Law	1	Tufts College	1
Rutgers University	8	Tulane University	1
St. Andrew's College	1	Tulsa University	1
St. Andrew's College	3	Union College	1
St. Bonaventure University	1	UNRRA University, Moscow	1
St. Francis College	1	U. S. Coast Guard Academy	2
St. John's College	2	U. S. Merchant Marine Academy	12
St. John's University, N. Y.	3	U. S. Military Academy	1
St. Joseph's College	2	U. S. Naval Academy	1
St. Joseph, de Rio Grande	1	Uppsala College	1
St. John's College	1	Utah College	2
St. Lawrence University	1	Urbana College	1
St. Louis University	1	Utah State Agricultural College	10
St. Mary's College of California	1	Utah University of	1
St. Mary's University	1	Utah, University of, The	1
St. Michael's College	2	Nebraska	1
St. Olaf College	1	Vanderbilt University	2
St. Thomas, College of	1	Villanova College	1
St. Vincent College	1	Virginia Military Institute	1
Seaside, University of	1	Virginia Polytechnic Institute	1
Seaside, University of	2	Virginia Union University	10
Seaside College	1	Virginia University of	1
Seaside College, Iowa	1	Vytautas the Great, University of	1
Seaside University, Constantinople	1	Lithuania	1
Seaside College	2	Wabash College	1
Seaside, University of, Belgium	1	Wake Forest College	1
Seaside University	1	Wales, University of	1
Seaside, University of	2	Walden, Minnesota University	1
Seaside, School of Mines	1	of Finland	1
Seaside, School of Mines	2	Washington College	1
Seaside, University of the	1	Washington and Lee University	1
Seaside, Memorial State College	1	Washington Maritime College	1
Seaside, University of	1	Washington State College of	1
Seaside, University of	1	Washington University	1
Seaside, University of	2	Washington University of	1
Seaside, University of	1	Wayne University	1
Seaside, University of	1	Waynesburg College	1

The Law School

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Western College	1	Welles College	1
Western University	2	Wesleyan University	1
West Virginia Institute of Technology	1	Wesleyan and Mary College of	3
West Virginia University	1	Wesleyan Junior College	2
West Virginia Wesleyan College	1	Wesleyan College	2
Western Maryland College	5	Wesleyan Teachers College	2
Western Missouri College of Education	1	Wesleyan University	7
Western Reserve University	2	Wesleyan College	1
Western State College of Colorado	1	Wesleyan Presbyterian Institute	1
Westminster College	2	Wesleyan University of	1
Whitman College	1	Yale University	22
Whitman Municipal University of	1	Yonkers College	1
	3	Zurich University of Switzerland	1

SUMMARY OF LAW SCHOOL REGISTRATION

FALL TERM 1954-55

	Men	Women	Total
First Year	349	19	368
Second Year	230	13	243
Third Year	297	11	308
Candidates for the degree of Master of Laws	55	3	58
Candidates for the degree of Master of Comparative Law	12	0	12
Candidates for the degree of Master of Comparative Law (American Practice)	9	0	9
Candidates for the degree of Doctor of Juridical Science	11	0	11
Unassigned	29	4	33
Total	992	50	1,042

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1955-56

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WASHINGTON, D. C.

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BY THE UNIVERSITY

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1955-56

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Event	Days	Comments
Feb. 2 and 3..... Feb. 4.....	Thursday and Friday. Monday	Registration Classes resume for the spring term.
Feb. 17.....	Friday	Last day on which candidates may file their subjects for the degree of Master of Science in Engineering to be conferred in June.
Feb. 22..... March 3-April 4.....	Wednesday	Winter Convocation. Holiday.
April 2.....	Friday through Wednesday	Examination room.
April 13.....	Monday	Announcements for applications for 1926-27 should be filed.
	Friday	Last day for receiving those and independent petitions of candidates for the Master's degree, and for the preliminary election in Engineering to be conferred in June.
May 16.....	Wednesday	Last day of classes for the spring term.
May 21-29.....	Monday through Thursday	Spring term examination period.
June 3..... June 6.....	Friday	Graduation Services.
Sept. 20 and 21.....	Wednesday	Commencement.
	Thursday and Friday	Registration for the fall term of the academic year 1926-27.

THE UNIVERSITY

THE BOARD OF TRUSTEES

The Board of Trustees of the University is composed of the President of the University ex officio and the following persons by election:

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Alexander Wetmore, Ph.D., Sc.D.

*Charles Stanley White, M.D., Sc.D.

David Bennett Wilson

*Nominated by the alumni.

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THE UNIVERSITY

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Benjamin Douglass Van Evera, Ph.D., Sc.D., *Coordinator of Scientific Activities*

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George Martin Koehl, A.M., *Dean of the Junior College*
Henry Grattan Doyle, A.M., LL.D., Litt.D., *Dean of Columbian College*
Robert Whitney Bolwell, Ph.D., *Chairman of the Graduate Council*
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John Theodore Fey, LL.B., M.B.A., J.S.D., *Dean of the Law School*
Martin Alexander Mason, B.S. in Eng., Ing.-Dr., *Dean of the School of Engineering*

Engineering

Charles Watson Bliven, M.S., *Dean of the School of Pharmacy*
James Harold Fox, A.M., Ed.D., *Dean of the School of Education*
Arthur Edward Burns, Ph.D., *Dean of the School of Government*
Elmer Louis Kayser, Ph.D., LL.D., *Dean of the Division of University Studies*

Students

Warren Reed West, Ph.D., *Dean of the Division of Special Studies*
Mitchell Dreese, Ph.D., *Dean of the College of General Studies*
Victor Frederick Ludewig, A.B., B.S., *Administrator of the University Hospital*

Hospital

William Lewis Turner, Ph.D., *Assistant Dean of the Junior College*

- Carl Bartleson Lavell, A.M., *Assistant Dean in the Junior College*
Cavin Darlington Linton, Ph.D., *Assistant Dean of Columbian College*
Anas MacIvor Griffin, Ph.D., *Assistant Dean of the School of Medicine*
Carville Dickinson Benson, A.B., LL.B., S.J.D., *Assistant Dean of the
Law School*
Louis Harkey Mayo, B.S., LL.B., *Assistant Dean of the Law School*
Pete Windsor Rutner, A.M., Ed.D., *Assistant Dean of the School of
Education*
Joe Lee Jessup, M.B.A., *Assistant Dean in the School of Government*
John Francis Latimer, Ph.D., *Assistant Dean of the College of General
Studies; University Marshal*
Gage Allee, Jr., Ph.D., *Assistant Dean of the Division of Univer-
sity Students*

HISTORY AND ORGANIZATION

HISTORY

The idea of a university located in the Capital of the Nation was sponsored by George Washington, who during his public life urged the establishment of such an institution and who in his will left fifty shares of stock in the Potomac (Canal) Company for the endowment of a university to be established in the District of Columbia "to which the youth of fortune and talents from all parts thereof might be sent for the completion of their Education in all the branches of polite literature—in arts and Sciences,—in acquiring knowledge in the principles of Politics & good Government".

It was George Washington's hope that the "General Government" would extend toward such an institution "a fostering hand". No steps were taken by Congress to carry out the provision of Washington's will and the stock that he had bequeathed for the establishment of a university in the District of Columbia became valueless owing to the failure of the Potomac Canal properties.

Meanwhile, however, a movement was started by private persons under the leadership of Luther Rice to establish an institution of higher learning at the seat of the National Government for the education of the Baptist ministry and to afford general collegiate training. In 1810 an association was formed by Luther Rice, Obadiah B. Brown, Spencer H. Cone, and Enoch Reynolds for the purpose of raising funds to buy land for the use of the college.

A group of the Nation's leaders who were especially interested in Washington's idea became patrons of the college and contributed to funds raised for the purchase of land and erection of buildings. Among them were James Monroe, President of the United States; William H. Crawford, Secretary of the Treasury; John C. Calhoun, Secretary of War; William Wirt, Attorney General; Return J. Meigs, Postmaster General; and thirty-two members of the Congress.

Legally to implement the college a petition was made to Congress for the incorporation of "the General Convention of the Baptist Denomination in the District of Columbia for evangelical and literary purposes." This petition was denied by Congress, on April 20, 1820, because of its sectarian character.

Failing to obtain a denominational charter, members of the association enlarged their objective to embrace national aims, and with the sponsorship of Government leaders there was presented in Congress a

all for the incorporation of "the Columbian Society for literary patronage", it being proposed to realize in this way "the aspirations of Washington, Jefferson and Madison for the erection of a university at the seat of the federal government".

Acting upon this second petition, on February 6, 1821, Congress chartered Columbian College in the District of Columbia, inserting in the charter by special action the provision "That persons of every religious persuasion shall be capable of being elected Trustees; not shall any person, either as President, Professor, Tutor or reader, be retained admission into said College or denied any of the privileges, immunities or advantages thereof, for or on account of his sentiments in matters of religion".

This Columbian College in the District of Columbia was chartered as one of the early nonsectarian institutions of higher learning in the United States, under the distinguished favor of President James Monroe and members of his Cabinet.

An area of approximately forty-seven acres, extending about one-half mile west of Boundary Street (Florida Avenue) between Fourth and Fifteenth Streets, was purchased and by 1822 the main building was completed substantially to plan.

Two years later, when the first Commencement was held on December 17, 1824, Congress and the Supreme Court adjourned their sessions to give their members to attend the exercises. President Monroe, John Quincy Adams, John C. Calhoun, Henry Clay, and the Marquis de Lafayette presided the numerous company in attendance.

By an act of Congress of March 3, 1872, the name of the college was changed to "Columbian University", in recognition of the enlarged scope of the institution. In 1884, the University was moved from its first location on "College Hill", now Columbia Heights, to the new University Hill lot for it at Fifteenth and H Streets. Nearby buildings accommodated the School of Medicine and, somewhat later, the Law School.

For a period of six years, from 1828 to 1834, the University was placed under control of the Baptist Denomination. In 1834 an act restoring the original secular character of the University and authorizing change of name to "The George Washington University" was passed by Congress.

Subsequently all the colleges, schools, and divisions of the University were brought together in the area bounded by Wisconsin, Twenty-third, and G Streets, and Pennsylvania Avenue NW. The School of Medicine is situated on H Street between Thirtieth and Fourteenth Streets NW.

The endowment of the University is \$2,000,000.

THE COLLEGES, SCHOOLS, AND DIVISIONS

The George Washington University includes **fourteen colleges, schools and divisions, as follows:**

The **Junior College** offers the work of the first two years of the four-year college program in the liberal arts and sciences; two years of pre-professional work; and two-year terminal courses. Each of these curricula leads to the degree of Associate in Arts.

Columbian College offers the work of the junior and senior years of the four-year college program in the liberal arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. It also offers the studies leading to the degrees of Master of Arts and Master of Science in the fields of the liberal arts and sciences.

The Graduate Council offers a program of advanced study and research leading to the degree of Doctor of Philosophy.

The **School of Medicine** offers work leading to the degree of Doctor of Medicine.

The **Law School** offers professional and graduate courses leading to the degrees of Bachelor of Laws, Juris Doctor, Master of Laws, Master of Comparative Law, and Doctor of Juridical Science.

The **School of Engineering** offers courses leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering, Master of Science in Engineering, and Master of Engineering Administration. It also directs work leading to the professional degrees in the fields of civil, electrical, and mechanical engineering.

The **School of Pharmacy** offers courses leading to the degrees of Bachelor of Science in Pharmacy and Master of Science in Pharmacy.

The **School of Education** offers undergraduate programs leading to the degrees of Bachelor of Arts in Education, Bachelor of Science in Home Economics, and Bachelor of Science in Physical Education, and graduate studies leading to the degrees of Master of Arts in Education and Doctor of Education.

The **School of Government** offers undergraduate programs of study in Foreign Affairs, Accounting, Business Administration, and Statistics leading to the degree of Bachelor of Arts in Government. Graduate work is offered leading to the following degrees: Master of Arts in Government in the fields of Foreign Affairs, Economic Policy, Accounting, Business and Economic Statistics, and Counseling; Master of Arts in Public Administration in the fields of General Administration and Governmental Fiscal Administration; Master of Arts in Personnel Administration; Master of Business Administration; and Doctor of Business Administration.

The College of General Studies supplements the adult education pro-

gram of the University through its Off-Campus Division, Campus Division, and Division of Community Services.

The Division of University Students makes available courses for mature students, not candidates for degrees in this University.

The Division of Special Students makes available courses for students in the process of qualifying for degree candidacy.

The Division of Air Science offers a program of Air Force ROTC training which is integrated with the curricula of the colleges and schools of the University and leads to appointment as a commissioned officer in the United States Air Force Reserve.

The Summer Sessions.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine is a member of the Association of American Medical Colleges and is one of the medical colleges which have been continuously approved by the American Medical Association. The School of Pharmacy is accredited by the American Council on Pharmaceutical Education as a class "A" school. It is a member of the American Association of Colleges of Pharmacy. The School of Engineering is on the accredited list of the Engineers' Council for Professional Development. The School of Education is a charter member of the American Association of Colleges for Teacher Education.

LOCATION

The George Washington University is in downtown Washington four miles west of the White House and east of the Potomac River with its extensive parkway. Readily accessible to the University are many of the departments of the Government, including the Department of State, the Department of the Treasury, the Department of Justice, the Department of the Army, the Department of the Navy, the Department of the Interior, the Department of Agriculture, the Department of Commerce,

and the Department of Labor, as well as the National Archives, the Capitol, the Library of Congress, the National Academy of Sciences, the Pan American Union, the National Gallery of Art, and the Corcoran Gallery of Art.

GOVERNMENT

The government and general educational management of The George Washington University are vested in a self-perpetuating Board of Trustees, with the President of the University as a member *ex officio*. The members of the Board are named for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting to fill the places of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

THE SCHOOL OF ENGINEERING

1955-56

THE SCHOOL OF ENGINEERING

THE FACULTY AND STAFF OF INSTRUCTION *

MARTIN ALEXANDER MASON, B.S. in Eng., Ing.-Dr., Dean of the School of
Engineering.

GEORGE ABRAHAM

ROSE ABRAHAM
Lecturer in *Latent & Engineering*
BSc. in *Latent & Engineering*
and *Latent & Engineering*

MAN BRUCE AMES

NORMAN BRUCE AMES

BRUCE AMES
Electrical Engineering
1915, Massachusetts

[illegible]

ROBERT BLETCHON

P. E. ELCHOV
 Lecturer in Mechanical Engineering
 Department of Mechanical Engineering
 University of London

[illegible]

WILLIAM WALTER BALWANZ
Lecturer in the School of Education
BIRMINGHAM

BAIWANZ

MAS BENJAMIN BROWN:

THOMAS BENJAMIN BROWN

ALBANY, N. Y., 1872.

DAWIN CAMP

GLENN DARWIN CAMP

DARWIN CAMP
B. S. ...
... AM ...
... WASH DC

1940-1941, *Journal of the American Association of University Professors*, 27, 1, 1-2.

1. The University of the Pacific, The House of Excellence of the Hawaiian, the House of the Pacific, Assistant Professor and Assistant Professor, University of the Pacific, Honolulu, Hawaii.

ROBERT HAMILTON MOORE

Associate Professor of English Composition

A.B. 1933, A.M. 1935, Indiana University; Ph.D. 1938, University of Chicago; The University of Illinois 1939-41; The University of Illinois 1941-43; The University of Illinois 1943-45; The George Washington University 1945-47; Member, Delta Kappa

CHARLES RUDOLPH NAESER

Professor of Chemistry

B.S. 1931, University of Wisconsin; M.S. 1933, Ph.D. 1935, University of Wisconsin; Chemical Warfare Service 1942-45; Technical Advisor, B.O. Equipment, Chemical Warfare Service 1945-47; Professor of Chemistry 1947-; The George Washington University; Member, ACS, AAAS, AAUP, Sigma Xi

RICHARD EDWARD NEARMAN

Associate in Mechanical Engineering

B.M.E. 1931, The George Washington University; Mechanical Engineer 1931-34; Associate in Mechanical Engineering, The George Washington University 1934-37; Member, Sigma Tau, ASME

HAROLD VALDEMAR OERTING

Lecturer in Electrical Engineering

B.S. in E.E. 1923, Georgia School of Technology; Supervisor of Electric Power, Electric Power Company 1923-25; Lecturer in Electrical Engineering, The University of Georgia 1925-27; Member, Illuminating Engineering Society

RICHARD NORMAN OWENS

Professor of Business Administration

A.B. B.S. in E.E. 1927, University of Missouri; A.M. 1928, Ph.D. 1928, University of Missouri; C.P.A. 1928; State of Illinois, Assistant Professor of Business Administration 1928-30; Assistant Professor of Business Administration 1930-32; Professor of Accounting and Business Administration 1932-34; Professor of Business Administration 1934-37; The George Washington University; Member, Beta Beta Beta, Phi Delta Kappa

GEORGE PIDA

Lecturer in Electrical Engineering

B.E.E. 1927, The George Washington University; Head, Test Section 1927-30; 1930-32, Naval Research Laboratory; Associate and Lecturer in Electrical Engineering, The George Washington University 1932-37; Member, AIEE

RAWLINGS STINE POOLE

Personal Lecturer in Engineering Administration

B.S. 1934, North Carolina State College; Degree, Master of Science in Engineering Administration 1934-35; Head, Estate 1935-36; Chief, Engineering Administration 1936-37; Lecturer in Engineering Administration 1937-38; The George Washington University; Member, Phi Delta Kappa

DWIGHT EDWARD SHYTLER

Lecturer in Electrical Engineering

Executive Vice-President and Chief Engineer, Continental Engineering Company, U. S. Navy 1934-36; Instructor in Electrical Engineering, The George Washington University 1937-; Member, ASME

LEWIS SLACK

Associate Professor of Physics

B.S. 1934, Harvard University; Ph.D. 1937, Washington University; Research Laboratory 1937-41; Assistant Professor of Physics, The George Washington University 1941-; Member, Sigma Xi, Phi Kappa Phi, Phi Eta Chi

BENJAMIN FRANKLIN SLINGLUFF

Lecturer in Electrical Engineering

B.S. in E.E. 1917, David Langdon of Technology; Supervisor of Electric Power, Electric Power Company; Lecturer in Electrical Engineering, The George Washington University 1917-19; Member, AIEE

WALDO EDWARD SMITH

EDWARD SMITH
Lecturer in Civil Engineering
M.Sc. Eng. MS. C. Eng.

and Lecturer in Civil Engineering
 The M.C.E. 1922 MS & C.E. 1924 The State University of Iowa, Homewood, Iowa
 Graduate School, Water Conservancy, 1924-1925
 Graduate School, 1924-1925 Assistant Professor, 1925-1926
 Graduate School, 1926-1927 Professor, 1927-1928
 Graduate School, 1928-1929 Professor, 1929-1930
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 Graduate School, 2198-2199 Professor, 2199-2200
 Graduate School, 2200-2201 Professor, 2201-2

VICTOR SZEBEHELY

RESPECTFULLY
 Lecturer in Mechanical Engineering
 Anna University, Chennai
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[illegible]

JAMES HENRY TAYLOR
Professor of Mathematics

HENRY TAYLOR
Professor of Mathematics
B. S. 116, U. C.

1916, University of Nebraska; A.M. 1920, Princeton University; Ph.D. 1924, University of Chicago; Instructor, University of Nebraska, 1920-22; National Research Council, 1922-24; Assistant Professor, University of Wisconsin, 1924-26; Professor of Mathematics, The George Washington University, 1926-1931; Member, A.M.S., M.A.A., A.A.P., A.A.S., Washington Academies of Sciences, Philadelphia Society of Washington, Sigma Xi.

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FRANCIS TRUMBULL
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 (U.S. S. 1940-1942, Worcester Polytechnic Institute, Chief Instructor, Applied Mechanics)
 (U.S. S. 1942-1947, Worcester Polytechnic Institute, New England Institute of Technology)
 (U.S. S. 1947-1950, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1950-1952, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1952-1954, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1954-1956, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1956-1958, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1958-1960, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1960-1962, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1962-1964, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1964-1966, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1966-1968, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1968-1970, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1970-1972, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1972-1974, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1974-1976, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1976-1978, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1978-1980, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1980-1982, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1982-1984, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1984-1986, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1986-1988, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1988-1990, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1990-1992, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1992-1994, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1994-1996, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1996-1998, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 1998-2000, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2000-2002, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2002-2004, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2004-2006, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2006-2008, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2008-2010, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2010-2012, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2012-2014, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2014-2016, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2016-2018, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2018-2020, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2020-2022, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2022-2024, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2024-2026, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2026-2028, Worcester Polytechnic Institute, Worcester, Massachusetts)
 (U.S. S. 2028-2030, Worcester Polytechnic Institute, Worcester, Massachusetts)

ROBERT CORBIN VINCENT

AB VINCENT
12:45 AM
M...

JOHN VINCENT
 Professor of Chemistry
 12:45 A.M. - 1:15 P.M. General University, Instructor in Associate Professor
 1:15 P.M. - 2:45 P.M. General University, The General Washington University
 Monday, May 1, 1900, P.M.

JACK EDWARD WAITERS

WARD WALTERS

[illegible]

CARL HUGO WALTHER
Professor of German

WALTER
B. G. G. Engineering
S. G. M. C. E.
M. G. C. E.

Civil Engineering
 Civil, M. S. E. Univ. of Texas at Austin
 Member, American Society of Mechanical Engineers
 Civil Engineering, University of California, Berkeley
 The General Engineering Council, 1947-48
 The General Engineering Council, 1947-48
 Member, ASCE, ASME

FRANK MARK WEIDA
Professor of Statistics
BS

ANNE WEIDA
Ph.D. 1933, Kalamazoo College
Ph.D. 1933, State University of Iowa

University of Iowa, 1917-24; Assistant Professor, Lehigh University, 1924-27; Assistant Professor to Professor, 1927-28; Professor of Statistics, 1928-29; The George Washington University, Member, AA. Mach. Soc., Mass. Acad. Nat. Sci., Stat. Soc. Amer., Philosophical Society of Washington, Washington Academy of Sciences.

RICHARD HENRY WELLES

Lecturer in Civil Engineering
B.C.E. 1922, The George Washington University; Civil Engineer, Bureau of Yards and Docks, Department of the Navy, 1923; Lecturer in Civil Engineering, The George Washington University, 1933.

THE ADVISORY COUNCIL

ALLEN VARLEY ASTIN, Ph.D.

Director of the National Bureau of Standards

LYMAN JAMES BRIGGS, Ph.D., Sc.D., LL.D.

Trustee of the University

HUGH LATIMER DRYDEN, Ph.D., Sc.D., D.Eng.

Director of Research of the National Advisory Committee for Aeronautics

RALPH LEON GOETZENBERGER, B.S., E.E.

Vice President of the Minneapolis-Honeywell Regulator Company

CHARLES HOOK TOMPKINS, D.Eng.

President of the Charles H. Tompkins Company; Trustee of the University

DANIEL CHARLES WALSER, B.S.

Consulting Engineer, Chairman of the District of Columbia Board of Registration for Professional Engineers

The Council is made up of friends of the University who are intimately familiar with the educational needs of the professional community served by the School. The Council is advisory to the Dean of the School of Engineering; it serves the function of relating the School to the educational requirements of the engineering and scientific constituency served by the School.

GRADUATE ASSISTANTS 1954-55

Percy Harry Andros, B.S. 1938, University of Utah

Harold Ficken Stegman, C.E. 1931, Rensselaer Polytechnic Institute

Albert Richard Stirni, B.S. in C.E. 1934, Georgia Institute of Technology

Leo Stanley Straw, B.S. in C.E. 1929, South Dakota State College of Agriculture and Mechanic Arts

STUDENT ASSISTANTS 1954-55

Civil Engineering.—Basil Boteler, Melvin Michael Brady, William Bernard Essel, Thomas Gilbert Flanagan, Jr., Almerigo Giulio Howard Shain Keen, Dorothy Anita Leonard, James Franklin Saunders, Jr., Arthur Paul Savage, Joan Story

Electrical Engineering.—Melvin Michael Brady, Harry Marvin

Brandler, Jose Lime e Silva de Moraes, Henry Breckenridge Paris, Jr.
Mechanical Engineering.—Harry Marvin Brandler, Kenneth Wayne
 Scott, Robert Howard van Sickler

ADMINISTRATIVE STAFF

Jane McMullan, A.B., *Secretary to the Dean*
 Helen Ann Morris, A.B., *Secretary*
 Jean Noble Huffman, B.S., *Clerk-Typist*

COMMITTEES*

THE DEAN'S COUNCIL‡

1956

Carl Hugo Walther
 Charles Edward Greeley

1957

Norman Bruce Ames
 Bruce Douglas Greenshields

1958

James Henry Taylor
 Jack Edward Walters

COMMITTEE ON ADMISSIONS AND ADVANCED STANDING

Norman Bruce Ames, *Chairman*
 Benjamin Carpenter Cruickshanks
 Raymond Pugh Eymen

COMMITTEE ON SCHOLARSHIP

The Dean of the School, *Chairman*
 Thomas Benjamin Brown
 Benjamin Carpenter Cruickshanks
 John Kaye
 James Henry Taylor
 Carl Hugo Walther

COMMITTEE ON GRADUATE STUDIES

Thomas Benjamin Brown
 Norman Bruce Ames
 Carl Hugo Walther
 Forest Klaire Harris
 John Kaye
 Richard Norman Owens
 James Henry Taylor
 Jack Edward Walters
 Victor Szekely
 Keith Harder (Liaison Member)

* The Presidents of the University and the Dean of the School of Engineering are members
 of all committees
 ‡ Elected by the Faculty

GENERAL INFORMATION

INTRODUCTORY

The School of Engineering was organized October 1, 1884 as the Corcoran Scientific School of Columbian College and was situated in the University Building then at 15th and H Streets, NW. The school was named in honor of William W. Corcoran, Trustee and President of the Corporation from 1869 to 1888. Day and evening courses were offered in Literature, Science, and Technology and led to the degrees of Bachelor of Science, Civil Engineer, Mechanical Engineer, and Mining Engineer. The School was among the first to accept women for degree candidacy in engineering.

In 1902 the Corcoran Scientific School, the School of Graduate Studies, and the Columbian College were merged into a single Department of Arts and Sciences. Engineering degrees were made graduate in character and the student was required to hold a Bachelor of Science degree as a prerequisite to entrance. An indication of the developing character of the School is found in the entrance requirements which stated that "The candidate must give evidence he has completed a liberal undergraduate course—which was of such character as to fit him to pursue to advantage the study of advanced engineering subjects".

Administrative changes led to The Washington College of Engineering being initiated in 1905 as one of the several semi-independent undergraduate colleges of the University, each with its own Board of Trustees. The College provided instruction leading to undergraduate degrees in engineering and architecture.

In 1909 the name of the College was changed to the College of Engineering and Mechanic Arts, and the curricula were revised to give the student a thorough understanding of the theory underlying engineering practice. Emphasis was placed on the development of a knowledge of scientific principles upon which the student could build and by which he might solve new problems as they are met in practice.

The name of the school was changed again in 1914 to the College of Engineering and later to the School of Engineering. Architecture was dropped from the curriculum and degrees were limited to the field of engineering. However, the primary emphasis upon principles rather than technology which had characterized the School since 1902 was continued and has remained to this day as one of the important distinguishing features of the School.

It has become traditional in the School of Engineering to maintain an intimate relationship between the students and the modern practices of engineering by including among the staff of instruction practicing engineers familiar with the latest problems and procedures of engineering science. The instructors participating in this plan bring to the student a

direct contact with the practice of engineering and help to insure an effective balance of instruction between the principles of engineering and application of the principles to the many new problems confronting engineers today.

The courses of instruction are open to both men and women, continuing the practice first initiated in 1884.

OBJECTIVE

The objective of the School of Engineering is to produce graduates who possess knowledge and understanding of the fundamental scientific principles in their fields of study; some skill in their application; and an attitude of responsibility toward society and the engineering profession.

PROGRAMS OF STUDY

Programs of undergraduate study are offered leading to the degrees of Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, and Bachelor of Science in Engineering (with optional areas of concentration).

Graduate work is offered under the supervision of the Committee on Graduate Studies, leading to the degrees of Master of Science in Engineering, and Master of Engineering Administration.

HOURS OF INSTRUCTION

Courses of instruction are scheduled in the morning, afternoon, and evening. Evening classes are identical with daytime sections of corresponding courses, may be taught by the same instructors, and carry the same amount of credit. By taking the evening and summer classes and extending the time of study beyond the customary four years, a student who is able to give only part of his time to college work may complete a regular course and obtain a degree.

VETERANS EDUCATION

The Office of Veterans Education of The George Washington University operates as a service bureau for veterans interested in studying at the University and acts in a liaison capacity between the University and the Veterans Administration. Here information may be obtained concerning the educational program of the University and the procedure for securing the educational benefits for veterans of World War II (Public Law 346) or "Korean" veterans (Public Law 550).

PUBLIC LAW 346

At least thirty days prior to registration the veteran desiring to attend under this GI Bill should apply to the Veterans Administration Veterans Benefits Office, Munitions Building, Twentieth Street at Constitution Avenue, for a Certificate of Eligibility and Entitlement for presentation to the Office of Veterans Education at the time of registration. Veterans who have attended another institution under the GI Bill must obtain a Supplemental Certificate of Eligibility to present to this University.

PUBLIC LAW 550

At least thirty days prior to registration the veteran desiring to attend under this GI Bill should apply to the Veterans Administration Veterans Benefits Office, Munitions Building, Twentieth Street at Constitution Avenue, for a Certificate of Education and Training, for presentation to the Office of Veterans Education at the time of registration. A photostatic copy of separation papers must accompany the original application for certification.

VOCATIONAL REHABILITATION

Disabled veterans desiring vocational rehabilitation under either GI Bill should apply to the Veterans Administration, Veterans Benefits Office, Munitions Building, Twentieth Street at Constitution Avenue, for approval of their training objectives at least sixty days prior to registration.

ADMISSION

Credit for work done in the service schools is granted provided the veteran has not been out of the service for three years or more. To be considered for such credit veterans should submit to the Director of Admissions photostatic copies of their records indicating courses successfully completed with sufficient identification of the course to enable the Admissions Office to locate it in the Guide to Evaluation of Educational Experience in the Armed Forces.

AIR FORCE RESERVE OFFICERS' TRAINING CORPS**ELIGIBILITY REQUIREMENTS**

Membership in the Air Force ROTC Unit is open to any regularly enrolled full-time male student between the ages of 18 and 25, who is a citizen of the United States, physically fit, of good character, and a candidate for a Bachelor's degree. Students who successfully complete the basic course or have equivalent active military training may be

selected to enter the advanced course. Students in the advanced course receive from the Government a subsistence allowance of approximately \$500, which is exempt from income tax. During the period of the summer camp the advanced student receives, in addition, \$75 a month, plus food, lodging, and travel expense. Uniforms, textbooks, and training materials are provided for all Air Science courses.

A student enrolling in the basic course must agree to successfully complete the two year course as a prerequisite to graduation from the University.

MILITARY SERVICE DELAY

Deferment from induction under the Selective Service Act of 1951 may be granted to selected students within authorized quotas. Normally, a student is not considered for draft deferment until he has completed one term's work in the University, with a quality-point index of at least 2.00. A student's deferment is subject to withdrawal if his quality-point index falls below 2.00.

The Air Force Reserve Officers' Training Corps (Air Force ROTC) unit was established at the University in 1951 under authority of Section 40-47C, National Defense Act of June 3, 1916, as amended. Air Force personnel, approved by the President of the University, are detailed by the Department of the Air Force to supervise and instruct the Air Force ROTC cadets.

The mission of the Air Force ROTC program is to select and prepare students through a permanent program of instruction to serve as commissioned officers in the Regular and Reserve components of the United States Air Force. Classroom instruction and leadership training is provided to develop in the student the knowledge and the attributes of character, personality, and leadership required of officers in the United States Air Force. Emphasis is placed on arousing in the student a desire to serve his country as a flying officer.

A student applying for enrollment in the advanced courses must, if selected, sign a contract to complete the course as a prerequisite to graduation; attend a four-to-six-week summer camp; and fulfill all the obligations conjunctive with military service delay.

HEALTH ADMINISTRATION

The University maintains a health service that is primarily diagnostic in its intent. For medical emergencies and health consultations there is on the Campus, a Student Health Clinic open from 9:00 A.M. to 5:00 P.M., with physician and nurse in attendance. There is also a rest room for women, with a graduate nurse in charge.

Medical privileges include: (1) the physical examination of every student entering from secondary school; (2) three visits by the University

physician or surgeon, office or residence (District of Columbia), in any one illness, exclusive of a specialist, surgical operation, laboratory, or X-ray examination; (3) hospitalization, including board and nursing in the University Hospital for not more than one week during any twelve month period—the necessity to be determined by the Director of Health Administration. The duration of hospitalization period (maximum, one week) is also to be determined by the Director of Health Administration.

This medical benefit does not apply to illness or disability incurred previous to the University term or prior to payment of tuition fees.

The student is allowed if he so desires, to engage physicians and nurses of his own choice, but when he does so he will be responsible for the fees charged.

Rules: (1) The Director of Health Administration is empowered to limit or deny the medical benefits where, in his discretion, a student has by his misconduct or breach of the rules of the University, made himself ineligible; (2) the Director of Health Administration has authority to determine the necessity and length of hospitalization; (3) a student who has severed his connection with the University is ineligible for medical benefits; (4) a student intending to train for an athletic team is required to pass a thorough examination at the beginning of each term; (5) the above regulations apply also during the summer term of the University.

The University is not responsible for injuries received in inter-collegiate or intra-mural games, or in any of the activities of the departments of physical education.

LIVING ACCOMMODATIONS

Women Students.—The Hattie M. Strong Residence Hall provides single rooms at \$35 a month and double rooms at \$20 a month a person. Meals are served at the Student Union. Admission to the University does not include dormitory reservation. A separate application for a room should be made well in advance (for the fall term by May first, for the spring term by January first). Forms for application, together with detailed information, may be obtained from the Director of Activities for Women.

Girls under the age of twenty-one who are enrolled for twelve or more credit hours of academic work in the University and who are not living with their parents or relatives may live outside the dormitory only with the permission and approval of the Director of Activities for Women upon receipt of written requests from parents. In no case will permission be granted for such girls to be domiciled outside the dormitory except with persons approved by the Director of Activities for Women.

Men Students.—Welling Hall provides double room facilities for 102

students. Rooms rent for \$24 a month a person. Dining facilities are available to all residents. Meals are served at the Student Union. Application forms for room reservation may be obtained from the Director of Activities for Men, Building R, 2027 H Street NW.

Information concerning private rooming and boarding facilities near the University, for women students twenty-one years of age or older and for men students, may be obtained at the Housing Office, Lisner Auditorium. The reservation of rooms in private houses must be made by students.

RELIGIOUS LIFE

The University recognizes the contribution that religion can make to the education of its students by encouraging them to participate in denominational clubs of their own choice. National Catholic, Jewish, and Protestant bodies sponsor these religious organizations, which act as links between the University and the local churches. The Director of the University Chapel and the advisers to the various denominational organizations are available throughout the year for consultation on personal problems.

UNIVERSITY CHAPEL

The University Chapel is maintained as a non-sectarian expression of the faith of the University in the contribution that religion can make to the education of its students. Twenty-minute services are held Wednesday of each week at 12:10 P.M. Representative clergymen of Washington are guest speakers at these non-denominational services.

STUDENT PLACEMENT OFFICE

The Student Placement Office, 2114 G Street NW., provides assistance to students and alumni seeking full- and part-time employment. This office maintains a registry of positions locally and nationally available, and refers qualified applicants for consideration. Information is also available on Civil Service examinations.

VOCATIONAL COUNSELING

The University Testing Center is at 2114 G Street NW. The Center offers educational and vocational testing and counseling service. This office maintains a file of occupational information and training opportunities.

STUDENT UNION

The Student Union, 2125 G Street NW., is the center for student life. From the cafeteria on the first floor to the game room on the fourth floor it is well planned to meet the students' need for meals, study, recreation, and activities. In addition to the recreation lounge and social lounge the Student Union provides office space for the Student Council and for the other major student organizations.

The Student Activities Office, also in the Student Union, has available information concerning the student organizations and campus events.

DAVIS-HODGKINS HOUSE

The Davis-Hodgkins House, 731 Twenty-second Street, NW., is the engineering student center, providing lounges, reading rooms, and student organization offices. The House provides convenient, comfortable facilities for the exchange of ideas and good fellowship among student engineers.

INTERNATIONAL HOUSE

The International House, 2116 G Street NW., is the social center for students from foreign countries. A series of teas, dances and other forms of entertainment, and the use of club rooms and lounge enable students to become acquainted and feel at home in the University.

The International Students Society welcomes as members students from other lands as well as North American students.

The Adviser to students from Foreign Countries, whose office is in International House, is available for advice and guidance.

STUDENT ACTIVITIES

DIRECTORS OF STUDENT ACTIVITIES

The University maintains the offices of the Director of Activities for Men and the Director of Activities for Women, for the guidance of students in all nonacademic phases of student life, such as, student activities, social life, and housing. The directors are available for individual counseling concerning personal adjustment to university life.

STUDENT GOVERNMENT

Student Council.—The Student Council is responsible to the Director of Activities for Men and the Director of Activities for Women for the conduct of all student activities. Members of the Council are elected annually.

Committee on Student Life.—The Committee on Student Life is the judicial branch of the student government. It is composed of not more than seven members of the faculty, two of whom are the Director of Activities for Men and the Director of Activities for Women, appointed by the President of the University, and the following student members: President of Student Council, President of Mortar Board, President of Omicron Delta Kappa, President of the Interfraternity Council, and President of Panhellenic Council, and an Editor of the *Hatchet*, appointed by the President of the University. This Committee has the power to review the acts of all student organizations, including the Student Council and set aside acts that are contrary to established policy and regulations of the University or the Committee.

Approval of Student Organizations.—This Committee is granted authority to approve or disapprove the establishment of any proposed organization on campus. No student club or society (except social fraternities, sororities, scholastic honor societies, religious or professional clubs or societies) organized as a branch or affiliate of a non-George Washington University organization will be recognized by the Committee on Student Life.

ELIGIBILITY FOR STUDENT ACTIVITIES

Any student registered in The George Washington University is eligible to participate in nonathletic student activities of the University; however, a student having a scholastic average of less than 2.00 is not eligible to be:

- 1 A member of the Dance Production groups, Glee Club, Cheerleaders, Student Council, Religious Council, Panhellenic Council, Inter-fraternity Council, Engineers' Council, Student Life Committee, or any publications staff
 - 2 An officer, permanent committee chairman, or member of the executive board of any activity.
- The rules and policies of the Southern Conference govern participation in intercollegiate athletics.

THE ENGINEERS' COUNCIL

The Engineers' Council is the student governing body for the School of Engineering. It is composed of two elected representatives from each year class, one representative from each student organization in the School of Engineering, the Business Manager of the engineer student magazine, and the House Manager of the Davis Hodgkins House. The purpose of the Council is to provide liaison between the student body of the School of Engineering and the Faculty, Administration, and Student

Government of the University in all matters affecting the general interests and welfare of the student body, the School of Engineering at the University. The Council is maintained financially by the Engineering Council Fee paid by each student in the School of Engineering and sponsors the engineer student magazine, *Mechelelec*; the Annual Engineering Mixer, Engineers' Ball, Engineers' Banquet, and the Annual Christmas Tree Ceremony in the University Yard. Council meetings are open to all students in the School of Engineering.

The Council acts as the directing body for *Mechelelec*, the engineer student magazine. The magazine is published six times a year and is sent free to all engineering students. It includes campus and engineering news, a calendar of events, news of the student organizations, and articles on engineering by students and faculty members. The magazine is published by a student Board of Editors and a volunteer student staff.

The control and administration of all student activities are outlined in a separate bulletin.

STUDENT ORGANIZATIONS

HONOR SOCIETIES

Sigma Xi.—A national scientific honor society, the purpose of which is to encourage original investigation in science pure and applied. Outstanding graduate students in the sciences are eligible for full membership, and undergraduates who have shown marked ability in research may be elected to associate membership.

Omicron Delta Kappa.—A national fraternity emphasizing leadership in extracurricular activities.

Phi Eta Sigma.—A national fraternity, established to encourage and reward high scholarship and attainment, membership in which is open to those freshman men who attain a scholastic average of at least 3.0.

Sigma Tau.—A national engineering fraternity, the purpose of which is to recognize scholarship and professional attainment.

PROFESSIONAL ORGANIZATIONS

American Society of Civil Engineers (Student Chapter).—Membership open to students who are candidates for a civil engineering degree or the degree of Bachelor of Science in Engineering.

American Institute of Electrical Engineers (Student Chapter).—Membership open to candidates for an electrical engineering degree.

American Society of Mechanical Engineers (Student Chapter).—Membership open to candidates for the degree of Bachelor of Mechanical Engineering.

Institute of Radio Engineers (Student Chapter).—Membership open to students in electrical engineering who are taking the communications option, or who are interested primarily in electronics.

Theta Tau (Gamma Beta Chapter).—A national professional (engineering) fraternity. Membership by invitation to outstanding students who have completed successfully at least the freshman year in the School of Engineering.

SOCIAL FRATERNITIES

Sigma Chi, Kappa Sigma, Theta Delta Chi, Phi Sigma Kappa, Sigma Alpha Epsilon, Sigma Phi Epsilon, Phi Alpha, Sigma Nu, Acacia, Tau Kappa Epsilon, Pi Kappa Alpha, Tau Epsilon Phi, Alpha Epsilon Pi, Delta Tau Delta.

SOCIAL SORORITIES

Pi Beta Phi, Chi Omega, Sigma Kappa, Alpha Delta Pi, Delta Zeta, Kappa Delta, Phi Sigma Sigma, Zeta Tau Alpha, Kappa Kappa Gamma, Delta Gamma, Kappa Alpha Theta.

RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai B'rith Hillel Foundation, Canterbury Club, Christian Science Organization, Lutheran Student Association, Newman Club, Religious Council, Student Christian Fellowship, Wesley Club, Westminster Foundation.

MUSICAL ORGANIZATIONS

The George Washington University Glee Club.

STUDENT PUBLICATIONS

Amicus Curiae (Law School publication), *The Cherry Tree* (the annual), *The University Hatchet* (weekly newspaper), *The George Washington Law Review*, *Mechelen* (engineers' publication), *The Perculator* (pharmaceutical publication).

OTHER ACTIVITIES

Alpha Phi Omega—National Service Fraternity, Alpha Theta Nu (scholarship winners), Big Sisters, Cheerleaders, Chess Club, Colored Boosters, Fencing Club, Flying Sponsors, Interfraternity Council, Interfraternity Pledge Council, International Relations Club, International Students' Society, Inter-sorority Athletic Board, Intramural Council, Junior Panhellenic Association, Masonic Club, Sailing Association, Senior Panhellenic Association, Strong Hall Council, Student Council,

The George Washington University Dramatic Activities, Women's Coordinating Board, Women's Recreation Association.

There is a complete program of intramural sports for both men and women.

ADMISSION

The School of Engineering accepts men and women.

Students may enter The School of Engineering at the beginning of the fall term, the spring term, or the summer term.

GENERAL ADMISSION REQUIREMENTS

The following factors are considered in determining the eligibility of an applicant for admission:

1. The adequacy of previous academic work as preparation for the course of study now contemplated—including quantity and quality of work and the standing of the institution in which it was done.
2. The aptitude of the student for the course contemplated.
3. The character of the student.

The University reserves the right to refuse admission to any student who has a previous academic record of such grade as to create doubt of his ability to pursue college work successfully, or who for any other reason would not be a desirable student.

APPLICATION FOR ADMISSION

An applicant for admission must obtain from the Office of the Director of Admissions an application blank which he must fill out completely and return with the application fee of \$3. A recent photograph, with signature, of the applicant must be attached to the blank.

An applicant for admission to the Reserve Officers' Training Corps must also fill out and return a supplemental Air Force ROTC application form.

Applications should be filed not later than July 1 for the fall term, January 1 for the spring term, and May 1 for the summer term.

An applicant from a secondary school must send the high school record form provided by the University to his high school principal with the request that the principal fill out the form and mail it directly to the Office of the Director of Admissions.

An applicant who has previously attended an institution of higher learning must request the registrar of that institution to mail directly to the Office of the Director of Admissions a transcript of his record. If he has attended more than one such institution he must request the registrar of each institution to send to the Office of the Director of Admissions

sions a transcript of his record, *even though credits were not earned*, together with an honorable dismissal from the institution last attended.

The Graduate Record Examination administered by the Educational Testing Service, Princeton, New Jersey, is accepted as supplemental evidence of the applicant's educational attainment, and the appropriate report should accompany the application for admission whenever available.

METHODS OF ADMISSION

FROM SECONDARY SCHOOLS

An applicant from a secondary school may seek to qualify for admission by certificate or examination.

BY CERTIFICATE

A certificate of graduation with a minimum of fifteen "units"* from an accredited secondary school and the recommendation from the principal of the secondary school that the applicant is prepared to undertake college work will be considered subject to the following conditions:

1. If the school is accredited by the regional accrediting association, the student must rank not lower than the fourth fifth of his class.
2. If the school is not listed by the regional accrediting association, but has been accredited by the state accrediting agency, the student must rank in the upper three fifths of his class.

By College Entrance Board Examinations

An applicant may qualify by passing satisfactorily College Entrance Board examinations as prescribed by the Director of Admissions. These examinations are given at a large number of examination centers throughout the United States, including Washington, D. C., on August 10 and December 3, 1955; and January 14, March 17, May 19, and August 8, 1956.

Arrangements for the examinations should be made with the College Entrance Examination Board, Post Office Box 502, Princeton, New Jersey, not less than one month before the date of the examinations.

FROM HIGHER INSTITUTIONS†

An applicant for advanced standing may be considered for admission upon the presentation of satisfactory credentials from an accredited institution of higher learning. The student must be in good standing as

* A unit represents a year's study in a secondary school subject, including in the aggregate no less than 125 sixty-minute periods of prepared classroom work.
 † The University reserves the right to refuse admission credit in whole or in part, or to allow it provisionally. Credit so given may be withdrawn for subsequent poor work.

to scholarship and conduct, and must be eligible to return to the previously attended institution in the term for which he seeks admission to this University.

If the transcript of record from such an institution includes the record of his secondary school work, it is not necessary for the applicant to have forwarded a separate record directly from the principal of the secondary school. High school work is considered only as fulfilling entrance requirements; it is never credited toward advanced standing.

Properly certified courses taken at accredited colleges or universities may be applied toward a degree at this University, subject to the curriculum requirements and regulations of the school or college to which admission is sought. Work of low pass grade (such as *D* or the equivalent) will not be considered for transfer.

ENTRANCE REQUIREMENTS

Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, Bachelor of Science in Engineering.

—An acceptable certificate of graduation from an accredited secondary school, or the satisfactory passing of College Entrance Board examinations in secondary school subjects selected with the approval of the Director of Admissions is required.

Nine and one half of the fifteen units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. A graduate of an approved high school who does not offer for admission the particular subjects required for the engineering curriculum, but who does present not less than fifteen acceptable units, may be admitted on condition if such deficiency in the distribution of units does not exceed two units.

Advanced standing may be granted for work successfully completed at accredited institutions of higher learning. Credit will be assigned by the School of Engineering to the extent that the work taken at previous institutions meets the requirements for the degree sought at this University, and subject to the general University regulations concerning satisfactory subsequent work.

Master of Science in Engineering.—Applications for admission to candidacy for the degree must be made to the Committee on Graduate Study of the School of Engineering, through the Director of Admissions of the University.

Applicants are required to satisfy the Committee of their capacity for productive study in the discipline and must have acceptable personal qualities. Applicants holding Bachelor's degrees in engineering from recognized institutions and whose record, in the opinion of the Com-

mitter, gives evidence of adequate preparation for graduate study may be admitted to candidacy for the graduate degree. Applicants who do not hold a satisfactory degree, or whose adequacy of preparation is questioned may be admitted to candidacy upon successful completion of a qualifying examination prescribed by the Committee.

Study of a graduate character completed prior to application for candidacy for the graduate degree will be considered by the Committee in determining the applicant's candidacy, provided it contributes substantially to the achievement of mastery of principles and methods.

Master of Engineering Administration.—Application for admission to candidacy must be made to the Committee on Graduate Studies, through the Director of Admissions of the University.

Applicants are required to satisfy the Committee of their capacity for productive study in the discipline, and must have acceptable personal qualities. To qualify for admission, applicants must hold a Bachelor's degree in engineering or science from a recognized institution; have had some supervisory or administrative experience; and give evidence of preparation adequate for graduate study in this field. Applicants who do not hold a satisfactory Bachelor's degree, or whose adequacy of preparation is questioned, may be admitted to candidacy upon successful completion of a qualifying examination prescribed by the Committee.

Study of a graduate character prior to application for admission to candidacy for the graduate degree will be considered by the Committee in determining the applicant's candidacy, provided it contributes substantially toward the objective of the discipline.

The Professional Degrees—Civil Engineer, Electrical Engineer, Mechanical Engineer.—Application may be made not sooner than three years after graduation from this University provided the candidate can demonstrate definite responsibility for engineering work of substantial importance. Application must be made to the Dean. The applicant must be a graduate of the School of Engineering of The George Washington University.

Unclassified Students

An applicant eligible for admission to candidacy for a graduate degree, except that he requires substantial remedial or preparatory work in a limited area, may, at the discretion of the Dean, be admitted as an unclassified student.

REGISTRATION

Before a student may be admitted to registration he must have satisfied the Office of the Director of Admissions that he is qualified to enter the University.

A student who has previously matriculated in the University, but who has not been in attendance during the term prior to registration, should file an application for readmission in advance of registration.

Registration is for the term unless otherwise indicated on the registration paper. No registration is accepted for less than a term or one summer session.

A student may not register concurrently in The George Washington University and another institution without the permission of the Dean. Allowance of credit for work done concurrently will be at the discretion of the Committee on Admission and Advanced Standing.

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record, if and when desired; (2) the services of the Placement Office; (3) the use of University library facilities, except as otherwise designated; (4) gymnasium privileges; (5) admission to all athletic contests, unless otherwise specified; (6) subscription to the *University Hatcher*, the student newspaper; (7) admission to University debates; (8) medical attention and hospital services as described under Health Administration, pages 23-24. These privileges, with the exception of the issuance of transcripts, terminate, and a student is no longer in residence, when he withdraws or is dismissed from the University.

FEES AND FINANCIAL REGULATIONS

Application fee, charged each applicant for admission, non-refundable	\$1.00
Tuition fee, for each credit hour* for which the student registers (except work toward a Master's degree in Engineering)	10.00
For the degree of Master of Science in Engineering	200.00
For the degree of Master of Engineering Administration	200.00
For work leading to and including the Comprehensive Examination	20.00
Graduation fee	75.00
For the Bachelor's Master's thesis	25.00
For the Professional thesis	25.00
Late-registration fee, charged each student who fails to register within the designated period	5.00
Withdrawal fee, charged each student who withdraws and withdraws prior to the regular registration	1.00
Service fee, charged each student for late payment of tuition	2.00
Reinstatement fee, charged each student who is reinstated after suspension for delinquency in fees	2.00
Residence fee, charged each student wishing to maintain "in residence" status during any term of absence from the University or after completion of tuition requirements	15.00

* Payment of tuition for the thesis entitles the candidate, during the student year of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is submitted, an additional payment of \$100.00 may be granted, without further tuition payment. In the preparation of the thesis, extensive use of printed material may be made, but it must be purchased for cash, and tuition paid on the same must be for a reported course.

For special physical examination.....	2.00
Engineers' Council fee, charged each student in the School of Engineering for each term or any part thereof except the summer term.....	1.50
For each examination to qualify for advanced standing and for each special examination.....	5.00
Laboratory checkout fee, charged each student in chemistry courses who fails to check out of the laboratory by the time set by the instructor.....	2.50
Transcript fee, charged for each transcript of record after the first.....	1.00

Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions. These fees are charged by the term and, unless otherwise indicated, may be deferred in three payments when the tuition is paid in this manner. Breaking of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee the individual student will be required to pay such additional charges as are determined by the department concerned.

PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street NW. No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each term are due and payable in advance at the time of registration.

In exceptional cases, subject to the approval of the Treasurer, the student may sign a contract for term charges, except for fees payable in advance, permitting payments as follows:

Fall Term.—One third at the time of registration; one third on November 3; one third on December 3.

Spring Term.—One third at the time of registration; one third on March 3; one third on April 3.

A student who fails to meet payments when due, but who pays his fees on or before the fifteenth of the month in which payment is due, is charged a service fee of \$1. A student who fails to meet payments by the fifteenth of the month in which payment is due will be automatically suspended and may not attend classes until he has been officially reinstated and has paid all accrued fees and a reinstatement fee of \$5.

A student suspended for failure to meet payments when due may not be reinstated for the term after two weeks from the date of suspension. Applications for reinstatement are to be made to the Office of the Cashier.

An auditor pays all fees chargeable to the student registered for credit except the late-registration fee.

WITHDRAWALS AND REFUNDS

Application for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Notification to an instructor is not an acceptable notice.

A student may not withdraw from either the basic course (2 years) or the advanced course (2 years) of the Air Force ROTC without the approval of the President of the University.

In authorized withdrawals and changes in schedules, financial adjustments will be made as follows:

Fall Term.—Withdrawal dated on or before October 31, cancellation of two-thirds of tuition charges; withdrawal dated on or before November 30, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to November 30.

Spring Term.—Withdrawal dated on or before February 29, cancellation of two-thirds of tuition charges; withdrawal dated on or before March 31, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to March 31.

In no case will a refund be made of the first third of the total tuition charges unless the registration is in advance and is cancelled before the regular registration day. In this case a withdrawal fee of \$5 is charged and tuition fees refunded. In no case will tuition be reduced or refunded because of nonattendance upon classes.

Payment applies only to the term for which a registration charge is incurred and in no case will this payment be credited to another term.

Any student in chemistry who fails to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a checkout fee in the amount of \$2. A student who drops a course before the end of the term must check out of the laboratory at the next regular laboratory period.

Any student enrolled in the Air Force ROTC who fails to turn in uniforms, equipment, and textbooks on separation from the Corps will be charged the value of the missing items.

Authorization to withdraw and certification for work done will not be given a student who has not a clear financial record.

SCHOLARSHIPS, PRIZES, FINANCIAL AID

SCHOLARSHIPS

Scholarships are awarded for two terms unless otherwise specified and are credited in equal parts for each term. Each holder must carry the full prescribed schedule during the period for which the scholarship is awarded. Except in the case of the School of Engineering and the Eugene and Agnes E. Meyer Scholarships, the applicants must have established an academic record in courses at this institution, and should apply on prescribed forms which must be filed in the Office of the Chairman of the Committee on Scholarships not later than April 1 preceding the academic year for which the scholarship is to be awarded. Further

information may be obtained from the Chairman of the Committee on Scholarships.

School of Engineering Scholarships.—Four scholarships, established in 1952, are available each year in the School of Engineering to graduates of accredited secondary schools. Each scholarship provides full tuition for one year. The holders of these scholarships must carry a full program in the School of Engineering.

Emma K. Carr Scholarships.—Six scholarships in the amount of \$400 each and eight of \$100 each, established in 1932 by Mrs. Emma K. Carr, are available to "young men (of the white race) for undergraduate or postgraduate work, considering character, capacity, and need".

Henry Harding Carter Scholarship.—This scholarship, in the amount of \$400, established in 1890 by Mrs. Maria M. Carter in memory of her husband, Henry Harding Carter, is available to a deserving student who is preparing for the civil engineering profession.

Maria M. Carter Scholarship.—This scholarship, in the amount of \$100, established in 1871 by Mrs. Maria M. Carter, is available to a young man.

Isaac Davis Scholarship.—This scholarship, in the amount of \$80, was established in 1809 by the Honorable Isaac Davis of Massachusetts. Nominations for the scholarship may be made "by the founder or his eldest lineal descendant". In case no such nomination is made, the scholarship is to be awarded by the University.

Henry Parsons Erwin Scholarship.—This scholarship, in the amount of \$200, established in 1955 by Mrs. Helen B. Erwin as a memorial to her husband, Henry Parsons Erwin, a former Trustee of the University, is available for a student in Engineering.

General Motors College Scholarship.—This scholarship, established in 1955 by General Motors Corporation, is available for an incoming freshman student who is a citizen of the United States and demonstrates outstanding talent, high personal qualifications, and financial need. The amount of the award has been made flexible and will range from an honorary award of \$200, up to an award of \$1,000 per year, depending upon the demonstrated need of the individual. It is renewable for the four years of undergraduate work, provided the student continues to meet the high standards established for the holder of this award.

Hazelton Scholarship.—This scholarship, in the amount of \$200, established in 1950 by the bequest of Lillie S. Hazelton, is awarded annually "for the use and assistance of needy and worthy students".

Eugene and Agnes E. Meyer Scholarships.—A scholarship fund, in the amount of \$2,500, established in 1952 by the Eugene and Agnes E. Meyer Foundation, is available annually "to assist promising students or applicants in meeting the costs of furthering their education, with preferential

consideration to children of persons who are employed in public service, including service in the armed forces or the judiciary."

David Spencer Scholarship.—This scholarship of \$150, established in 1918 by Miss Louisa J. Spencer, is available under certain restrictions.

The Zonta Club of Washington, D. C., Scholarship.—This scholarship, in the amount of \$300, offered by the Zonta Club of Washington, D. C., is available to a woman who is a senior or graduate student with special interest in a professional or business career.

THE COLUMBIAN WOMEN SCHOLARSHIP FUNDS

The Columbian Women Scholarships are awarded by the Scholarship Committee of the Columbian Women. Applications for these scholarships should be addressed to the Chairman of the Scholarship Committee, the Columbian Women, The George Washington University, Washington 6, D.C., not later than May 15 preceding the academic year for which the scholarship is to be awarded, or, in the case of award for the spring term, not later than January 1.

Nellie Maynard Knapp Scholarship Fund.—The income from this fund of \$5,000, established in 1915 in memory of a former president, Mrs. Martin A. Knapp, is available for scholarships for women.

Founders of Columbian Women Scholarship Fund.—The income from this fund of \$5,000, established in 1920, is available for scholarships.

Lillian Young Herron Scholarship Fund.—The income from this fund of \$5,000, established in 1925 and named in 1930 in memory of a former president, is available for scholarships.

College Women's Scholarship Fund.—The income from this fund of \$500, established in 1926 by the College Women's Club of Washington, D.C., is available for scholarship aid.

Grace Ross Chamberlin Scholarship Fund.—The income from this fund of \$2,300, established in 1932 in honor of a former president, is available for scholarship aid.

PRIZES

Alpha Chi Sigma Prizes.—Alpha Pi Chapter of Alpha Chi Sigma Fraternity offers annually the following prizes:

A "Handbook on Chemistry and Physics" is awarded to each of the three students who carry at least eighteen credit hours during the freshman year and attain the highest averages in freshman chemistry.

The name and year of graduation of the student who has attained the highest quality-point index in courses in chemistry will be inscribed on a bronze plaque. The winner must have had at least sixteen hours of chemistry including the final term at The George Washington University.

Alpha Delta Pi Prize.—Alpha Pi Chapter of Alpha Delta Pi Frater-

nity offers an annual prize of \$10 to the woman member of the junior class with the most outstanding record in scholarship, extra-curricular activities, and service to the University.

American Institute of Chemists Prize.—The District of Columbia Chapter of the American Institute of Chemists offers an annual prize of a medal and junior membership in the American Institute of Chemists to that graduating student, majoring in chemistry, who excels in scholarship and in the personal qualities of integrity and leadership.

Byrne Thurtell Burns Memorial Prize.—This prize of \$75 is awarded to the senior majoring in chemistry who shows the greatest proficiency in organic chemistry, as evidenced by a comprehensive examination, and who possesses such qualifications of mind, character, and personality as to give promise of future achievement.

Willie E. Fitch Prize.—The Willie E. Fitch Prize of \$75, established in 1883 by James E. Fitch, in memory of his son, is awarded annually to a senior student for the best examination in chemistry.

Martin Mahler Prize in Materials Testing.—This prize established in 1953 by Martin Mahler consists of a one-year membership in the American Society for Testing Materials and is awarded to the upper division or graduate student in engineering who submits the best reports on tests in the Materials Laboratories course with preference given to prestressed concrete tests.

Mortar Board Prize.—This prize, consisting of a silver cup, is awarded annually to the woman student in the sophomore class having a scholarship average of B or higher and the most outstanding record in activities.

Omicron Delta Kappa Prize.—Alpha Delta Circle of Omicron Delta Kappa Fraternity offers annually a plaque to be awarded to "that member of the senior class who throughout his course has done the most constructive work in the furtherance and upbuilding of the University student activities".

Phi Eta Sigma Prize.—The George Washington University Chapter of Phi Eta Sigma offers annually to the male student attaining the highest scholastic average in his first full term of work, a choice book selected from the field of the recipient's major interest. The winner's name will be engraved on a plaque in the Office of the Dean of the Junior College.

Phi Sigma Kappa Prize.—Phi Sigma Kappa Fraternity offers annually a silver cup to the winner of an oratorical contest, open to all freshmen.

Pi Beta Phi Prize.—A prize of \$20 is awarded annually by the District of Columbia Alpha Chapter of Pi Beta Phi Fraternity to that woman member of the senior class who throughout her college course has done the most constructive work in the promotion of student activities among the women of the University.

Ruggles Prize.—The Ruggles Prize of \$35, established by Professor William Ruggles in 1859, is awarded annually to a candidate for a baccalaureate degree for excellence in mathematics.

Sigma Kappa Prize.—Zeta Chapter of Sigma Kappa Sorority offers an annual prize of \$10 to the student with the highest grade in the final examination in General Chemistry.

Sigma Tau Prize.—Xi Chapter of Sigma Tau Fraternity offers annually a medal to be awarded to that member of the freshman class in the School of Engineering who maintains the highest scholastic standing in the work of the entire year.

James MacBride Sterrett, Jr., Prize.—This prize, established in 1911 by Professor James MacBride Sterrett in memory of his son, consists of books awarded annually to that student who obtains the highest average in Physics 6, 7, and 8.

Theta Tau Activities Plaque.—Gamma Beta Chapter of Theta Tau Fraternity offers annually a plaque to be awarded to that member of the senior class who has the most outstanding record in activities in the School of Engineering during the entire period of his attendance.

Alexander Wilbourne Weddell Prize.—This prize of \$350, established in 1923 by Mrs. Virginia Chase Weddell, is awarded annually to a candidate for a degree who writes the best essay on the subject of "the promotion of peace among the nations of the world". The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

MILITARY AWARDS

Air Force Association Silver ROTC Medal.—This medal, offered by the Air Force Association, is awarded annually to the Air Force ROTC Cadet of the senior class who, after completion of summer camp, is judged to be the outstanding cadet among those physically qualified for flying training who have indicated their intention to apply for such training upon graduation.

Reserve Officers' Association Gold ROTC Medal.—This gold medal, offered by the Reserve Officers' Association of the District of Columbia, is awarded annually to the Air Force ROTC Cadet of the junior class with the highest grades in the leadership and academic phases of the Air Force ROTC course for the current year.

Reserve Officers' Association Silver ROTC Medal.—This silver medal, offered by the Reserve Officers' Association of the District of Columbia, is awarded annually to the Air Force ROTC Cadet of the sophomore class with the highest grades in the leadership and academic phases of the Air Force ROTC course for the current year.

Reserve Officers' Association Bronze ROTC Medal.—This bronze medal, offered by the Reserve Officers' Association of the District of Columbia, is awarded annually to the Air Force ROTC Cadet of the freshman class with the highest grades in the leadership and academic phases of the Air Force ROTC course for the current year.

Reserve Officers' Association Junior Memberships.—Five junior memberships, offered by the Reserve Officers' Association of the District of Columbia, are awarded annually to the five Air Force ROTC Cadets of the junior class who obtain the highest grades for the first term in the academic phase of the Air Force ROTC course, Air Science III (101).

Pershing Rifles Achievement Medals.—These medals offered in gold, silver, and bronze are awarded periodically by the National Headquarters of the Pershing Rifles to those active Pershing Rifemen in the Advanced Air Force ROTC course who are judged by their cadet officers, faculty administration, and the Professor of Air Science to be outstanding examples of the ideals of the Pershing Rifles.

The Armed Forces Chemical Association Annual Award.—This award consisting of a scroll and a medal is offered by the Armed Forces Chemical Association annually to selected Air Force ROTC cadets majoring in chemistry or chemical engineering in their junior year. Nominations are made by the Director of Air Science and final selection is made by a board of three senior Air Force Officers.

Society of American Military Engineers Gold Medal.—This medal with Key Replica, offered by the Society of American Engineers, is awarded annually to selected Air Force ROTC cadets in the next-to-last year of their engineering course and in the last year of such course. Nominations are made jointly by the Director of Air Science and the Dean of the School of Engineering, and final selection is made by a board of three senior Air Force officers.

Convair Trophy.—This trophy, a replica of one of the nation's most modern aircraft, offered by Consolidated Vultee Aircraft Corporation, is awarded annually to the Air Force ROTC Cadet attaining the highest cumulative grade in Air Science III and IV among the cadets applying for flying training.

FINANCIAL AID

LOAN FUNDS

The following loan funds are available to students in the University in accordance with the qualifications placed thereon by the donors. Inquiries should be directed to the Office of the Treasurer.

University Loan Fund.—The Trustees of The George Washington University have established a loan fund of \$10,000.

Henry Strong Educational Foundation.—The Henry Strong Educa-

tional Foundation, established at Chicago under the will of General Henry Strong, makes available a fund for loans to both men and women students under the age of twenty-five years.

For information concerning full- and part-time employment, see "Student Placement Office", page 25.

REGULATIONS

A student enrolled in the School of Engineering is required to conform to the University regulations and to comply with the rules and regulations of the School of Engineering.

A student who withdraws or is suspended, or is otherwise absent from the University for one term or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be canceled and he will be ineligible (except by special action of the Faculty) for subsequent registration in any unit of the University.

ATTENDANCE

A student is not permitted to attend classes until registration has been completed and fees due have been paid. Regular attendance is required. A student may be dropped from any course for undue absence.

A student who has been suspended, either for delinquency in payment of fees or for any other reason, is not permitted to attend classes during the period of suspension.

The student is expected to attend every meeting of the course in which he is registered, fully prepared to carry on the work required. The student is held responsible for all work in the course, and all absences must be excused before provision will be made for him to make up the work missed. Excuses for absences from examinations which have been announced in advance can be obtained only by making written application to the instructor in charge of the course.

AMOUNT OF WORK

Eighteen credit hours, including required physical education, constitute normal full-time work. Nine credit hours constitute normal part-time work.

A full-time student who is not on probation may take ordinarily not

more than nineteen credit hours. A student employed more than twenty-four hours a week, who is not on probation, may take ordinarily not more than ten credit hours. A student whose quality point index is 3.00 or higher may be permitted by the Dean to exceed these limits by not more than two credit hours.

A student previously unemployed who accepts employment subsequent to registration or at any time during a term is required to report that fact immediately to the Dean, in order that adjustments in schedule may be made, if necessary, to bring his program within the Faculty's limitations upon the amount of work to be carried by an employed student.

ADVISORY SYSTEM

Every student entering the School of Engineering as a degree candidate is assigned a permanent Faculty adviser—for the purpose of guiding the educational career of the student, providing assistance in his professional development as an engineer, establishing close relations between the Faculty and the student, and furnishing counsel and advice in all phases of the academic career of the student.

Faculty advisers counsel students on their programs of study, the achievement and maintenance of satisfactory scholastic performance, professional development, extra-curricular activity as part of the educational process; and assist the entering student in orientation in the engineering discipline. The adviser represents the student in all cases requiring Faculty action.

Students are required to obtain their advisers' approval of programs of study prior to registration.

A student who has not completed the course work specified for the freshman and sophomore years is permitted to consult his adviser when so directed by the Dean, and to follow the recommendations of his adviser in all academic matters. However, advisers may not deny a student entry into any course or activity to which he is entitled under the regulations of the School of Engineering. Students having junior or senior status are encouraged to consult their advisers. The Dean acts as temporary adviser to entering or transfer students pending assignment of their permanent advisers.

All students are encouraged to discuss college problems with their advisers or instructors at any time; and parents or guardians are invited to consult with the Dean and advisers in respect to any student problems.

Faculty advisers discharge their counseling duties in accordance with the high principles of their professional responsibility; however, in accordance with professional concepts, the final responsibility for a student's action lies wholly with the student.

SCHOLARSHIP REQUIREMENTS

A student who fails to maintain the scholarship requirements of the School of Engineering may be dismissed from the University.

GRADES

Grades are not given out by instructors but are mailed to the student through the office of the Registrar at the close of each term. Upon request, a copy of the student's grades will be forwarded to his parent or guardian.

The following grading system is used: excellent, *A*; good, *B*; average, *C*; passing, *D*; failing, *F*. Whenever a grade has not been assigned, the symbol *Inc.* (incomplete) or the symbol *W* (authorized withdrawal) will be recorded. The symbol *Inc.* is a sign temporarily to indicate that all the required work of the course has not been completed and a satisfactory explanation has been given to the instructor. An "incomplete" can not be made up after the lapse of one calendar year except by permission of the Faculty. Courses from which a student has withdrawn by proper authorization will be indicated by the symbol *W*. No student may repeat for grade a course in which he has received a grade of *D* or above, unless required to do so by the department concerned.

For graduate work, grades are indicated as "excellent", "satisfactory", "unsatisfactory", or "incomplete".

QUALITY-POINT INDEX

Quality points are computed from grades as follows: *A*, four points; *B*, three points; *C*, two points; *D*, one point; *F*, no points, for each credit hour for which the student has registered.

Scholarship is computed in terms of the quality-point index, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on the complete collegiate record. Courses marked *W* or *Inc.* are not considered in determining the index, except that courses marked *Inc.* will be considered when a formal grade is recorded, or at the close of a calendar year, whichever occurs first. If an "incomplete" is not superseded by a proper grade within the allotted time, it is computed as zero quality points. Grades in courses taken at another institution are not considered in computing the quality-point index. Grades in courses taken to satisfy entrance requirements and in physical education courses are not considered in computing the quality point index.

SCHOLARSHIP

In order to graduate, a student must have a general quality-point index of at least 2.00 and, in addition, a quality point index of at least

2.00 in all work accepted for the degree in the School of Engineering.

Probation.—A student must maintain a quality-point index of at least 2.00, or be placed on probation. A student remains on probation as long as his quality-point index is below 2.00, or until his probation is removed by the Committee on Scholarship.

Probation is imposed for the amount of time required to complete a minimum of twelve additional credit hours or for one term, whichever is greater. In certain circumstances the period of probation may be extended. A student on probation may not hold office or participate in the activities of any student organization or represent the School in any undergraduate competition. Students placed on scholastic probation are required to complete counseling tests and remedial work as required by the Committee on Scholarship before continuing their study in the term succeeding the one in which they are placed on probation.

Suspension.—A student who has a quality-point index below 1.00 will be suspended. A student who becomes subject to probation for the third time, whether successive or after an interval, will be suspended.

A student suspended for poor scholarship may apply for readmission after an interval of one calendar year. He must then submit evidence to the Dean's Council that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. The Dean may require completion of counseling tests and prescribed remedial work before readmission is approved.

A student suspended twice for poor scholarship will not be readmitted.

The foregoing scholarship regulations are applied when a student has completed a minimum of twelve credit hours of work. Thereafter, the regulations are applied in multiples of twelve credit hours.

CHANGES IN PROGRAM OF STUDIES

A student may not change or drop courses or change his status to that of auditor except with the approval of the Dean of the School upon presentation of adequate reasons for such changes.

Change from one section to another of the same course or from one major subject to another within the School may be made with the approval of the Dean. All requirements specified in the course of study to which the change is made must be satisfied before graduation.

Transfer from one college, school, or division to another may be made only with the approval of the deans concerned. Applications for such change should be made on the proper form, obtainable in the Office of the Director of Admissions, where it should be filed.

Withdrawal from a course or from the University without a definite or financial penalty, requires the permission of the Dean. Permission to

withdraw from the University will not be granted a student who has not a clear financial record.

All charges for courses dropped without the approval of the Dean must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

During the seven days following the first day of classes of a term, additional courses may be added to the student's program with the approval of the instructor, the student's adviser, and the Dean.

During the thirty-five days following the first day of class in the course, courses may be dropped from a student's program, with the approval of the student's adviser and the Dean, and without academic penalty. Withdrawal from a course without the approval of the student's adviser entails a penalty of failure in the course.

Withdrawal from a course, without academic penalty, may be authorized by the Dean at any time upon presentation of written evidence of extenuating circumstances.

Unauthorized withdrawal from a course at any time entails a penalty of failure in the course and financial responsibility for the full fee for the course.

CREDIT

Credit toward a degree is given only after regular registration for and satisfactory completion of the required work of classes in the University, or upon the granting of advanced standing in accordance with the regulations of the School.

On request the Registrar will issue to the student a balance sheet showing the amount of work completed and the requirements, both quantitative and qualitative, remaining to be met for the degree.

TRANSCRIPTS OF RECORD

Official transcripts of student records will be forwarded on request to other institutions. Unofficial copies of records will be issued to the student on request. No charge is made for the first transcript; a fee of one dollar is charged for each one thereafter. No certificate of work done will be issued for a student who does not have a clear financial record.

SUMMER SCHOOL CREDIT

A student who plans to attend summer school sessions at another institution with the intention of having credits so obtained apply toward graduation from this University must first secure the written approval of the dean of his college or school. In no event will such credits be recognized to an amount in excess of that which might be earned in a similar period in this institution.

PHYSICAL EDUCATION REQUIREMENTS

Freshmen and sophomores in the School of Engineering are required to take Physical Education 1-2* and 11-12* (one credit hour only in each course) unless they are registered for less than 9 credit hours or unless regular employment during the day makes it necessary to take all classes during the evening hours. Veterans are not subject to these requirements.

Any other exemptions will be granted only upon written petition which has been recommended by the physical education department concerned and approved by the Dean of the School.

A student entering the University with advanced standing is not exempt from the physical education requirements unless he has satisfactorily met the requirements elsewhere. Courses in military training are not accepted in satisfaction of these requirements.

The required medical and physical examinations, as specified by the departments of physical education, will be arranged at the time of registration.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course whatever is deemed unsatisfactory may be reported by the instructor to the Dean's Council. The Council may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the Dean's Council.

GRADUATION REQUIREMENTS

To be recommended for graduation a student must have met the admission requirement of the School, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered, and be free from all indebtedness to the University.

Application for Graduation.—Application for a degree should be filed in the Office of the Registrar at the time of registration for the last term of the senior or final year.

Curriculum.—Curriculum requirements for the Bachelor's degrees are stated on pages 51-57; for the Master's degrees on pages 58 and 60.

* Freshmen in the School of Engineering enrolled in the Air Force ROTC schedule: Air Science 1-2 for Physical Education 1-2; Air Science 11-12 for Physical Education 11-12.

Graduate Record Examination.—All candidates for Bachelor's degrees are required to take two parts of the Graduate Record Examination in the University's institutional testing program. The examinations are conducted by the University twice a year: the Fall Testing Session (in December) for seniors graduating in February, and the Spring Session (in April) for those graduating in June or November. Dates of the examinations are announced in the *Schedule of Classes*.

Residence.—For the Bachelor's degrees, a minimum of one year or thirty-six credit hours must be completed in residence. Summer term work may be counted in residence, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in residence.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

Thesis or Comprehensive Problem.—A thesis or comprehensive problem submitted in partial satisfaction of requirements for the Master's degree or a professional degree in engineering must be presented in its final form to the Dean not later than the date specified in the University calendar. Three copies of each thesis or comprehensive problem are required, one typewritten original and two legible and complete carbon copies. Detailed instructions for the styling of all theses should be obtained from the Dean.

Accepted theses and comprehensive problems with accompanying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation. Permission to publish or adapt material in the thesis or comprehensive problem must be secured from the Dean.

Presence at Graduation.—A candidate is required to be present at the graduation exercises unless written application for graduation in absentia is approved by the Dean.

HONORS

With distinction.—The degree may be conferred "with distinction" at the discretion of the Faculty, if a student attains a quality-point index of 3.50 or higher on all work taken at this institution except that taken during the term immediately preceding the granting of the degree. To be eligible for this honor a student must have completed at this institution at least one-half of the work required for the degree.

Special honors.—Special honors may be awarded by the Faculty to any member of the graduating class for outstanding achievement in the

student's major field of work on recommendation of the major department, under the following regulations:

1. The student must have his candidacy for special honors approved by the faculty members representing the major department or field not later than the beginning of the senior year.

2. The student must meet such other conditions as may be set at the time his candidacy is approved.

3. No student will be awarded special honors unless he has a quality-point index of at least 3.00 on all work taken at this institution except that taken during the term immediately preceding the granting of the degree.

4. To be eligible for honors a student must have completed at this institution at least one-half of the work required for the degree prior to the beginning of the term immediately preceding the granting of the degree.

Military honors.—An Air Force ROTC cadet may be designated a "Distinguished Air Force ROTC Student" if he (1) has completed Air Science III with an academic standing among the upper third of the students enrolled therein; (2) has an accumulative academic standing among the upper third of all students in the institution pursuing the same academic major and scheduled to graduate the same school year, or an accumulative academic average of B or better; (3) possesses high moral character and definite aptitude for service in the Air Force; (4) has distinguished himself by demonstrated leadership through participation in recognized extracurricular activities and while in attendance at Air Force ROTC summer camp. Distinguished Air Force ROTC students are authorized to wear a "Distinguished" badge centered above the right breast pocket of the uniform.

An Air Force ROTC cadet may be designated a "Distinguished Air Force ROTC Graduate" if he has (1) been designated a Distinguished AFROTC Student and maintained the standards required of a Distinguished AFROTC Student during the period between designation and graduation; (2) completed the advanced Air Force ROTC course; (3) completed the requirements for a Bachelor's degree. Distinguished Graduates will be presented with a certificate signed by the Commandant, Air Force ROTC, and they will be given special consideration when they enter active military service and become eligible to apply for a Regular Air Force Commission.

THE LIBRARY

A student registered in the University is entitled to the reference use of the University Library. The Student Identification Card, issued upon the payment of fees, must be presented as identification.

Library books, with the exception of those in the Law and Medical collections, may be drawn for home use for a period of two weeks. Any book which does circulate is subject to recall by the Librarian at any time. Reserve books and periodicals for collateral reading must be used in the reading rooms when the Library is open. With special permission they may be drawn for overnight use when the Library closes. A fine of twenty five cents will be charged for the first hour or fraction of an hour and five cents for each hour or fraction thereafter that a reserve book is overdue. Grades of a student will be withheld until his library record is clear.

Hours

The University Library is open from 9:00 A.M. to 10:00 P.M. each class day (Saturday 9:00 A.M. to 5:00 P.M.), and from 2:00 to 6:00 P.M. on Sunday.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" Office is maintained in the Student Union.

THE BACHELOR'S DEGREES

The Bachelor's degrees are: Bachelor of Civil Engineering, Bachelor of Electrical Engineering, Bachelor of Mechanical Engineering, and Bachelor of Science in Engineering.

The degree of Bachelor of Science in Engineering may be earned with any of the following options: Business Administration, Chemistry, Economics, Machine Computer, Mathematics, Physics, or Statistics.

Curricula leading to the degrees of Bachelor of Civil Engineering, Bachelor of Mechanical Engineering, and Bachelor of Electrical Engineering are accredited by the Engineers' Council for Professional Development, the recognized accrediting body of the engineering profession.

CURRICULUM REQUIREMENTS

The satisfactory completion of one of the following curricula of 140 credit hours, exclusive of physical education, is required.

Physical Education is required of all students in the freshman and sophomore years. (See "Physical Education Requirements", page 47.)

Variations from the prescribed curricula may be made, with the permission of the Dean's Council. A student desiring to omit a required course and substitute another must make written application to the Dean presenting satisfactory reasons for the substitution; and written approval must be obtained before registration for the course.

A student who is absent from the University for one term or more (except on national service leave) is required to satisfy the curriculum requirements existing at the time of his return.

FRESHMAN YEAR (FOR ALL ENGINEERING CURRICULA)

	Credit Hours
Chem. 11-12	
CE 2	
Engl. 1, 2	
Math. 12	
Math. 19	
ME 1	
ME 3	
ME 4	
Phys. Ed.	
Phys. 6 and 7	
General Chemistry	8
Plane Surveying	2
Plane Trigonometry	2
Applied Geometry	2
Industrial Calculus	3
Orientation	1
Mechanical Drawing	2
Descriptive Geometry	2
See page 47 for statement of requirement.	
General Physics	4
Total	31

ROTC.—Air Force ROTC students substitute Air Science 1-2 (4) for Mechanical Engineering I (1) and Physical Education 1-2 (2).

SOPHOMORE YEAR (FOR ALL ENGINEERING CURRICULA)

	Credit Hours
Phys. 8	
Phys. 55	
Math. 20	
Math. 153	
Engl. 9-10	
CE 21	
CE 22	
Speech 1	
Lat. 11	
General Physics	4
Physical Measurements	2
Integral Calculus	2
Differential Equations	2
Elements of Electrical Engineering	2
Analytical Mechanics: Statics	2
Analytical Mechanics: Dynamics	2
Intermediate Speech	2
The Writing of Reports	2

* These students are required to complete a total of 140 credit hours in the minimum number of semesters specified. Students who are exempted from one or more of the courses listed above must complete the minimum number of credit hours in the remaining courses. Students who are exempted from one or more of the courses listed above must complete the minimum number of credit hours in the remaining courses. Students who are exempted from one or more of the courses listed above must complete the minimum number of credit hours in the remaining courses.

ME 13-14	Mechanism	4
CE 25-26	Engineering Materials	4
Phys. Ed.	See page 47 for statement of requirement.	
Total		37

ROTC—Air Force ROTC students substitute Air Science 51-52 (4) for Physical Education 11-12 (2) and Speech 1 (1).

Bachelor of Civil Engineering

JUNIOR YEAR

CE 123	Strength of Materials	3
CE 136	Elementary Fluid Mechanics	2
CE 140	Materials and Hydraulics Laboratory	0
ME 111-12	Thermodynamics	1
Phys. 132	Electronics	6
Econ. 1-2	Principles of Economics	3
CE 141	Graphic Statics	3
CE 142	Bridge Structures	5
* Institute	.....	14
Total		34

ROTC—Air Force ROTC students substitute Air Science 101-2 (6) for Elective (5).

SENIOR YEAR

CE 23	Higher Surveying	4
CE 164	Railway Engineering	1
CE 147-48	Structural Design	4
CE 149-50	Concrete and Masonry Construction	0
CE 151-52	Soil Mechanics and Foundations	4
CE 153-54	Water Supply and Sewerage	2
CE 157-58	Engineering Contracts and Specifications	1
CE 159-60	Professional in Civil Engineering	1
CE 162	Soil Mechanics	10
Total		30

ROTC—Air Force ROTC students substitute Air Science 151-52 (6) for Civil Engineering 157-58 (4) and Civil Engineering 159-60 (1).

Bachelor of Electrical Engineering

JUNIOR YEAR

CE 123	Strength of Materials	3
CE 136	Elementary Fluid Mechanics	2
CE 140	Materials and Hydraulics Laboratory	0

* Credit is not given for courses elected in Physical Education or Secretarial Studies.

ME 111-12	Thermodynamics	6
Phys 132	Electronics	3
Eng. 1-2	Principles of Electronics	6
EE 145-6	Direct-Current Laboratory	4
EE 147	Alternating-Current Circuits	3
EE 148	Alternating-Current Machinery	3
*Elective		3
Total		30

ROTC—Air Force ROTC students substitute Air Science 141-2 (2) for Electronics 2 (3) and Elective (3).

SENIOR YEAR		Credit Hours
1 Communications Option		
EE 115-16	Advanced Network Theory	6
EE 123-24	Advanced Network Laboratory	4
Phys 133	Electronic Circuits	3
EE 145	Applications of Electronic Devices	3
EE 141-12	Electrical Measurements	4
EE 146	Alternating-Current Machinery	3
EE 150	Electronic Device Laboratory	2
EE 153-54	Alternating-Current Laboratory	4
EE 157-59	Principles in Electrical Engineering	2
*Elective		3
Total		34

ROTC—Air Force ROTC students substitute Air Science 151-52 (4) for Electrical Engineering 157-59 (2) and Elective (3).

2 Power Option		Credit Hours
EE 159	Alternating-Current Machinery	3
EE 146	Electrical Design	3
EE 156	Industrial Engineering	2
EE 138	Industrial Electrical Power Applications	2
EE 129	Systematic Communications	3
EE 136	Principles of Electric Power Transmission	3
EE 111-12	Electrical Measurements	4
EE 143-54	Alternating-Current Laboratory	4
EE 157-59	Principles in Electrical Engineering	2
Phys 133	Electronic Circuits	3
*Elective		3
Total		34

ROTC—Air Force ROTC students substitute Air Science 151-52 (4) for Elective (3).

* Credit is not given for courses listed as Prerequisite for Senior Year.

Bachelor of Mechanical Engineering

JUNIOR YEAR

		Credit Hours
CE 123	Strength of Materials	3
CE 136	Elementary Fluid Mechanics	3
CE 140	Materials and Hydraulics Laboratory	6
ME 111-12	Thermodynamics	3
Phys. 132	Electronics	6
Econ 1-2	Principles of Economics	4
ME 141-42	Management Problems	2
ME 7	Machine Drawing	2
ME 8	Mechanism Drawing	2
• Elective	.....	2

Total 30

ROTC.—Air Force ROTC students substitute Air Science 121-2 (6) for Elective (8).

SENIOR YEAR

		Credit Hours
ME 129-30	Power Plants	4
ME 127-28	Machine Design	4
ME 139	Fluid Dynamics	3
ME 140	Mechanical Vibrations	3
ME 131-32	Heating, Ventilating, Air Conditioning, and Refrigeration	8
ME 126	Methods of Manufacture	2
ME 133	Combustion Engines	4
ME 115-16	Mechanical Laboratory	2
ME 189-90	Seminar in Mechanical Engineering	4
• Elective	.....	4

Total 34

ROTC.—Air Force ROTC students substitute Air Science 151-52 (6) for Mechanical Engineering 189-90 (2) and Elective (4).

Bachelor of Science in Engineering

JUNIOR YEAR

		Credit Hours
CE 123	Strength of Materials	3
CE 136	Elementary Fluid Mechanics	3
CE 140	Materials and Hydraulics Laboratory	6
ME 111-12	Thermodynamics	3
Phys. 132	Electronics	6
Econ. 1-2	Principles of Economics	4
ME 141-42	Management Problems	2
CE 187-88	Engineering Contracts and Specifications	2
• Elective	.....	2

Total 30

ROTC.—Air Force ROTC students substitute Air Science 1-1-2 (6) for Elective (8).

* Hours are not given for courses elected in Personal Education or Supplemental Studies.

Option

SENIOR YEAR

Credit

As approved by the department concerned

Hours

Total

34

NOTE—An ECE RPTC student who has an average 151-52 (87%) in the senior year (16) as approved by the department concerned.

The Bachelor of Science in Engineering curriculum provides training in the basic physical principles employed in engineering and in engineering methods of analysis, and in addition, offers an opportunity for study in optional fields in which the student has special interest.

Optional study can be selected from the fields of Business Administration, Chemistry, Economics, Machine Computer, Mathematics, Physics, or Statistics. The program of study in the option is formulated by the department concerned in conference with the student. The program, bearing the approval of the department concerned, must be submitted by the student to the Dean's Council for approval before the beginning of the senior year. During the period of optional study the student must comply with such regulations as the department concerned may prescribe.

The following curricula are recommended for the guidance of students by the several departments in which optional study is available. Variations from these curricula to satisfy the exceptional needs of individual students may be made by the department concerned.

BACHELOR OF SCIENCE IN ENGINEERING OPTIONAL CURRICULA

		Credit
		Hours
<i>Business Administration Option</i>		
Acct. 1-2	Intermediate Accounting	6
Bus. Adm. 101	Business Organization and Coordination	3
Bus. Adm. 131	Business Finance	3
Pol. Sc. 127	Commercial Law—Contracts, Sales, Agency, and Bailments	3
Elective		
From credit hours to be selected from the following:		
Acct. 1-4	Cost Accounting	
Acct. 111	Financial Statement Analysis	
Acct. 1-2	Business Economics	
Bus. Adm. 103	Personnel Management in Industry	
Bus. Adm. 105	Personnel in Personnel Management	
Bus. Adm. 107	Office Management	
Bus. Adm. 121	General Insurance	
Bus. Adm. 141	Principles of Marketing	
Bus. Adm. 145	Sales Management	
Bus. Adm. 151	Principles of Purchasing	
Eng. 171	Money and Banking	
Eng. 172	Insurance in Public Utilities	
Eng. 173	Insurance in Transportation	
Stat. 111	Business and Economic Statistics	

Chemistry Option

Chem. 21	Qualitative Inorganic Analysis	4
Chem. 22	Quantitative Inorganic Analysis I.....	4
Chem. 111-12	Physical Chemistry Lectures.....	4
Chem. 113-14	Physical Chemistry Laboratory.....	4
Chem. 122	Quantitative Inorganic Analysis II.....	4
Chem. 135	Inorganic Chemistry: Preparations	2
or 155	Organic Chemistry: Preparations	2
Chem. 151-52	Organic Chemistry	12
Elective	Two years of German recommended	

Economics Option

Econ. 101-2	Economic Analysis	4
Econ. 105	Business Cycles.....	2
Econ. 121	Money and Banking	2
Econ. 141-43	Labor Economics	4
Stat. 111	Business and Economic Statistics I	3
Stat. 112	Business and Economic Statistics II	3
Elective	Six credit hours in Economics, Statistics, or Business Administration selected with the approval of the Department of Economics.	

Machine Computer Option

(Junior Year)

ME 111-12	Thermodynamics	4
CE 123	Strength of Materials	2
CE 136	Elementary Fluid Mechanics.....	2
EE 107	Alternating Current Circuits	2
Phys 152	Electronics	3
Stat. 157-58	Mathematical Statistics	3
Math. 112	Mathematics for Engineers and Scientists	6
Math. 205	Modern Algebra	
*Elective	.....

(Senior Year)

ME 141-43	Management Problems	4
Phys 133	Electronic Circuits	3
EE 115	Advanced Network Theory I	3
EE 123	Advanced Network Laboratory	2
EE 145	Applications of Electronic Devices I	3
EE 146	Electronic Devices Laboratory	3
EE 171	Modern Computing Machines	3
EE 172	Machine Computer Circuitry	3
Math. 120	Advanced Analytic Geometry	6
Math. 143-44	Numerical Analysis	2
*Elective	.....

Mathematics Option

Four credit hours of mathematics beyond calculus, in second- and third-group courses.

Physics Option

Math. 132	Differential Equations	3
Phys. 100	Optics	3

* Credit is not given for courses listed in Physics Education or Secondary Science

Phys. 113-14	Atomic and Statistical Physics	6
Phys. 112	Electronics	3
Phys. 155	Advanced Physical Measurements	3
Statistics Option		
Stat. 91-92	Principles of Statistical Methods	6
Stat. 117	Analysis of Variance	4
Stat. 118	Correlation and the Chi-Square Test	3
Stat. 155-56	Mathematical Probability	6
Stat. 157-58	Mathematical Statistics	6

THE MASTER'S DEGREES

The Master's degrees are: Master of Science in Engineering and Master of Engineering Administration.

THE DEGREE OF MASTER OF SCIENCE IN ENGINEERING

Upon the satisfactory completion of the requirements of the School of Engineering the degree of Master of Science in Engineering is conferred. The discipline of this degree is designed to lead to a mastery of scientific principles and methods as they are applied in engineering. It is conceived that this objective can be served best by providing a relationship in which the intellectual needs and desires of the student are an important element in determining the curriculum. To this end the responsibility for the student's program of study is established in a Committee on Graduate Studies composed of members of the University Faculty and specialists selected from the engineering profession. Programs of study are prescribed for each candidate by the Committee on Graduate Studies or an assigned adviser, in accordance with his state of knowledge and needs, and as required to achieve the objective of mastery of principles and methods. They may consist of formal courses, independent study, or individual study under assigned faculty, and may include work in several departments and fields of study.

ADMISSION TO CANDIDACY

Application for admission to candidacy for the degree must be submitted to the Office of the Director of Admissions on the form prescribed by that Office. Applicants will be advised by the Committee on Graduate Studies of the time and place of the required personal interview.

Applicants are required to satisfy the Committee of their capacity for productive study in the discipline and must have acceptable personal qualities. Applicants holding Bachelor's degrees from recognized institutions, and whose record, in the opinion of the Committee on Graduate Studies gives evidence of adequate preparation for graduate

study may be admitted to candidacy for the graduate degree. Applicants who do not hold a satisfactory Bachelor's degree in engineering, or whose adequacy of preparation is questioned may be admitted to candidacy upon successful completion of a qualifying examination prescribed by the Committee.

ADVANCED STANDING

Graduate study completed prior to admission to candidacy for the graduate degree in the School of Engineering will be considered by the Committee on Graduate Studies in prescribing the candidate's program of study provided it contributes substantially to the achievement or mastery of principles and methods. In any case a minimum of one year full-time study must be completed under the Committee on Graduate Studies.

REQUIREMENTS FOR THE DEGREE

The candidate for the degree must complete a minimum of one year of full-time study, or the equivalent in part-time study, under the guidance of the Committee on Graduate Studies; complete the program prescribed by that committee, including course examinations; and demonstrate, by passing a comprehensive examination, substantial mastery of scientific principles and methods of their use in the area of his interest. This examination may be written, oral, or both, at the discretion of the Committee.

Candidates with limited areas of unsatisfactory preparation may be required to complete additional necessary remedial or preparatory study.

All of the work applied toward this degree must be accomplished under the guidance of the Committee on Graduate Studies.

Course work applied to satisfy requirements for another degree may not be applied to satisfy requirements for the graduate degree in engineering.

With the approval of the Committee on Graduate Studies the candidate may include a thesis in his program. He will be subject to an oral examination on his thesis.

The candidate's scholarship must be satisfactory to the Committee, and will commonly be required to be equivalent to the grade of B. A student whose work is unsatisfactory will be suspended by the Dean, upon the recommendation of the Committee on Graduate Studies or the student's assigned adviser.

The candidate must complete the requirements for the degree within three years, if he is a full-time student; within five years, if he is a part-time student.

THE DEGREE OF MASTER OF ENGINEERING ADMINISTRATION

Upon the satisfactory completion of the requirements of the School of Engineering the degree of Master of Engineering Administration is conferred. The purpose of this program is to offer, through academic study at graduate level, a means of improving the management and administrative ability of government and industrial engineers and scientists.

The objective of this graduate discipline is to develop a mastery of management principles and practices as they apply in the administration of engineering and scientific activities. Knowledge and understanding are sought rather than breadth of familiarity with techniques.

Study programs are prescribed for each candidate, in accordance with his preparation and objective, by the Committee on Graduate Studies. These programs are not curricula common to all candidates for the degree. They may consist of formal courses, independent study, or individual study under assigned faculty, and move freely among departments and fields of study. Each candidate is under the personal guidance of a selected faculty member.

ADMISSION TO CANDIDACY

Applications for admission to candidacy for the degree must be submitted to the Office of the Director of Admissions on the form prescribed by that Office. Applicants will be advised by the Committee on Graduate Studies of the time and place of the required personal interview.

Applicants are required to satisfy the Committee of their capacity for productive study in the discipline; must have acceptable personal qualities; must hold a Bachelor's degree in engineering or science from a recognized institution; must have had some supervisory or administrative experience; and give evidence of preparation, which in the opinion of the Committee, is adequate for graduate study.

Applicants who lack a satisfactory Bachelor's degree or whose adequacy of preparation is questioned may be admitted to candidacy upon passing qualifying examinations prescribed by the Committee. Applicants lacking satisfactory supervisory or administrative experience may, under certain circumstances, be considered by the Committee.

ADVANCED STANDING

Graduate study completed prior to admission to candidacy for the degree will be considered in prescribing the program of study, provided it contributes substantially to the achievement of the objective of the discipline. In any case a minimum of one year full-time study must be completed under the Committee on Graduate Studies.

Study applied to satisfy the requirements for another degree may not be applied toward the degree of Master of Engineering Administration.

REQUIREMENTS FOR THE DEGREE

The candidate for the degree of Master of Engineering Administration must successfully complete a minimum of one year full-time study or the equivalent in part-time study, as prescribed by the Committee on Graduate Studies, including course examinations; pass a comprehensive examination on his area of study; and solve a comprehensive problem in engineering administration. At the discretion of the Committee the examination may be written, oral, or both. Candidates with limited areas of unsatisfactory preparation may be required to complete necessary remedial study in addition to their graduate programs.

The candidate's scholarship must be satisfactory to the Committee, and will commonly be required to be equivalent to the grade of B. A student whose work is unsatisfactory will be suspended by the Dean upon the recommendation of the Committee or the adviser.

The problem which each candidate is required to solve may be proposed by the student, but it must be approved by the Committee. Its purpose is to demonstrate the candidate's ability to integrate his studies in the solution of a typical administrative problem of a comprehensive nature, requiring for its solution, knowledge of a variety of principles and procedures. The candidate is subject to oral examination on his problem at the discretion of the Committee.

The work for the degree, including the comprehensive examination, must be completed within three years by a full-time student, or within five years by a part-time student.

THE PROFESSIONAL DEGREES

The professional degree of Civil Engineer, Electrical Engineer, or Mechanical Engineer may be conferred upon a graduate of the School of Engineering who has demonstrated his professional ability.

REQUIREMENTS FOR THE DEGREE

1. Application may not be made sooner than three years after graduation, and then only if the candidate has had definite responsibility for engineering work of substantial importance.

2. A detailed statement of the candidate's experience, references, the degree sought, and the title of the dissertation must be filed with the Dean eight months before the Commencement at which the degree is to be conferred.

Detailed information concerning the preparation of the dissertation may be obtained from the Office of the Dean.

3. The dissertation will be read for acceptance by an examining committee appointed by the Dean to include members of the Faculty of the School of Engineering and at least one expert from engineering practice. The committee will report its recommendation to the Faculty of the School of Engineering.

COURSES OF INSTRUCTION

COURSES OF INSTRUCTION

On the following pages, under the alphabetically arranged names of the departments of instruction, are listed the courses of instruction offered in the School of Engineering. Also listed are courses offered by other schools and colleges of the University, but required or accepted as electives for the degrees in engineering. The courses as here listed are subject to some slight change. Students are referred to the schedule of classes, which is available prior to the opening of each term, for the hourly scheduling of all courses of instruction.

The University reserves the right to withdraw any course announced.

INDICATION OF THE AMOUNT OF CREDIT

The number of credit hours given for the satisfactory completion of a course is, in most cases, indicated in parenthesis after the name of the course. Thus, a year course giving three hours of credit each term is marked (3-3), and a term course giving three hours of credit is marked (3). A credit hour usually consists of the completion of one fifty minute period of class work or of one laboratory period a week for one term. A dagger (†) preceding the number of a year course indicates that the course may not be entered in the second term and that credit will not be given until the work of both terms has been completed.

CIVIL ENGINEERING

- 2 *Plane Surveying* (2)
Principles, methods, and instruments used in surveying, with field work. Prerequisite: Trigonometry. Surveying fee \$12. Lecture and field work.
- 21 *Analytical Mechanics: Statics* (2)
Composition and resolution of forces, static stresses, centroids, triangles. Prerequisite: Physics I, trigonometry or concurrent trigonometry. Mathematics 2.
- 22 *Analytical Mechanics: Dynamics* (3)
Kinematics of a particle, kinetics of a body in translation, rotation, and plane motion, work and energy, impulse and momentum, simple vibrations. Prerequisite: Civil Engineering 21.
- 23 *Higher Surveying* (4)
Elements of geodesy, trigonometry, astronomy, hydrography, and photogrammetry, with field work. Prerequisite: Civil Engineering 2. Surveying fee \$12. Lecture, laboratory, and field work.

- 24 *Elementary Photogrammetry* (3)
History and development of photogrammetry; fundamental principles, methods, and instruments used in photographic surveying and production of maps; photographic interpretation; principles of stereoscopy. Laboratory work with photographs and instruments in determination of scale, tilt, relief, and map plotting. Prerequisite: Civil Engineering 23. Physics 2. Laboratory fee, \$1.
- 25-26 *Engineering Materials* (2-2)
Emphasis on properties and uses of nonmetallic materials such as cements, fuels, and plastics; and metallic materials including steel, copper, aluminum, and alloys. Prerequisite or concurrent registration: Chemistry 12.
- 123 *Strength of Materials* (3)
Tension, compression, shear, flexure, and torsion; deflection; combined and working stresses. Prerequisite: Civil Engineering 21.
- 136 *Elementary Fluid Mechanics* (3)
Hydrostatics, dynamic equation, momentum principle, applications to incompressible and compressible fluid flow. Prerequisite: Civil Engineering 22.
- 140 *Materials and Hydraulics Laboratory* (2)
Determination of the properties of materials by mechanical tests, and a study of the flow of fluids. Prerequisite: Civil Engineering 123; prerequisite or concurrent registration: Civil Engineering 26 and 136. Laboratory fee, \$1.
- 141 *Graphic Statics* (3)
Fundamental principles, analyses of beams, determination of stresses in roof trusses and framed bents. Prerequisite or concurrent registration: Civil Engineering 123. Drafting-room fee, \$5. Lecture and drafting room.
- 142 *Bridge Stresses* (3)
Determination of stresses in modern types of bridge trusses. Prerequisite: Civil Engineering 141. Drafting-room fee, \$5. Lecture and drafting room.
- 147-48 *Structural Design* (2-2)
Concreting and drawings for the design of steel structures. Prerequisite: Civil Engineering 142. Drafting-room fee, \$5 a term. Lecture and drafting room.
- 149-50 *Concrete and Masonry Construction* (3-3)
Plan, concrete, general principles and theory of reinforced concrete, foundations, and retaining walls. Prerequisite: Civil Engineering 25 and 141. Civil Engineering 149 laboratory fee, \$10. Civil Engineering 150 drafting-room fee, \$5. Lecture, laboratory, and drafting room.
- 151-52 *Statically Indeterminate Structures* (2-2)
A study of such structures as continuous spans, rigid frames and arches by methods of work, slope deflection, and moment distribution. Prerequisite: Civil Engineering 142.

- 164 *Highway Engineering* (3)
Highway economics, location, construction, and maintenance. Prerequisite: Civil Engineering 25.
- 181-82 *Water Supply and Sewerage* (3-3)
Collection, storage, purification, and distribution of water; sewerage systems and treatment of sewage. Prerequisite: Civil Engineering 130; Chemistry 12.
- 187-88 *Engineering Contracts and Specifications* (2-2)
Contract essentials, types, and legal principles; analysis and preparation of specifications. Prerequisite or concurrent registration: Civil Engineering 25-26.
- 189-90 *Proseminar in Civil Engineering* (1-1)
Civil Engineering 189 is prerequisite to Civil Engineering 191.
- 192 *Soil Mechanics* (3)
The basic concepts of the behavior of soil as an engineering material. Prerequisite: Civil Engineering 25, 123, and 146.
- 201 *Advanced Mechanics of Materials* (3)
Advanced topics in the mechanics of materials. Stresses at a point, thick cylinders, general bending, torsion, localized stress, and stress concentration.
- 202 *Applied Elasticity* (3)
The theory of elasticity as applied in three-dimensional analysis of stress, strain, torsion, and bending.
- 203 *Foundation Problems* (3)
The interaction of structural theory and soil mechanics, as applied to foundations, retaining walls, slope stability, and drainage problems. The interrelationship of structural action and soil stability is emphasized.
- 204 *Theory of Structures* (3)
Advanced analysis and design of indeterminate structures, such as, continuous and suspended bridges, high building frames, arches, shell frames, and columns.
- 205 *Prestressed Concrete Theory* (3)
A study of the theory and applications of prestressed concrete, including the design of prestressed concrete structures.
- 297-300 *Thesis* (3-3)

ELECTRICAL ENGINEERING

- 9-10 *Elements of Electrical Engineering* (3-3)
Elemental Engineering of electronic and electric circuits, instruments, and machines. Electrical Engineering 100, alternating-current circuits, instruments, and machines. Prerequisite: Physics 7; prerequisite or concurrent registration: Mathematics 20.

105-6 *Direct-Current Laboratory* (2-2)

For the student majoring in electrical engineering. A course in measurements and direct current dynamo laboratory. Prerequisite: Electrical Engineering 9-10. Laboratory fee, \$10 a term.

107 *Alternating-Current Circuits* (3)

Alternating-current-circuit theory. Extensive consideration is given to harmonic analysis and to the study of harmonics in both single-phase and polyphase circuits. Prerequisite: Electrical Engineering 1-7.

108 *Alternating-Current Machinery* (3)

Transformers and synchronous generators. Prerequisite: Electrical Engineering 1-7.

109 *Alternating-Current Machinery* (3)

Synchronous motors, polyphase induction motors, single-phase motors, converters, mercury arc rectifiers. Prerequisite: Electrical Engineering 1-8.

111-12 *Electrical Measurements* (2-2)

Theory of direct-current and alternating current instruments, bridges and meters. Prerequisite or concurrent registration. Electrical Engineering 1-7.

115 *Advanced Network Theory I* (3)

Theory of resonance, linear networks, transmission lines, and filters. Prerequisite: Electrical Engineering 1-7.

116 *Advanced Network Theory II* (3)

Theory of transmission at UHF and VHF frequencies including Maxwell's equations, wave guides, and methods of power calculation at these frequencies. Prerequisite: Electrical Engineering 115 and Physics 132, prerequisite or concurrent registration. Physics 133.

123 *Advanced Network Laboratory I* (2)

A laboratory course associated with Electrical Engineering 115. Laboratory fee, \$10.

124 *Advanced Network Laboratory II* (2)

A laboratory course associated with Electrical Engineering 116. Prerequisite: Electrical Engineering 123. Laboratory fee, \$10.

129 *Symmetrical Components* (3)

Theory and application of symmetrical components in unbalanced circuits, alternating current machinery, and transmission lines. Prerequisite: Electrical Engineering 1-8.

130 *Principles of Electric Power Transmission* (3)

Mathematical and electrical characteristics of transmission lines, approximation and rigorous solutions by means of hyperbolic functions, steady-state and elementary transient calculations, the more important phases of distribution of electrical energy. Prerequisite: Electrical Engineering 129.

- 133-34 *Alternating-Current Laboratory (2-2)*
A continuation of Electrical Engineering 135-6, with experiments on alternating-current circuits, instruments, and machinery. Prerequisite: Electrical Engineering 135 and 136. Laboratory fee, \$10 a term.
- 138 *Industrial Electrical Power Applications (2)*
The characteristics of the various types of electrical motors and other power appliances, and the principles governing their applications in industry. Prerequisite: Electrical Engineering 135.
- 139 *Illumination Engineering (2)*
Principles and practice in present-day illumination engineering. Prerequisite: Electrical Engineering 135.
- 140 *Electrical Design (3)*
Principles of design, with reference to materials of construction and electrical equipment. Practical exercises are assigned in connection with classroom work. Prerequisite: Electrical Engineering 139. Lecture and laboratory.
- 148 *Applications of Electronic Devices (3)*
Practical applications of electronic devices such as power supplies, voltage regulators, multipliers, electronic counters, and communication. Prerequisite: Physics 143.
- 150 *Electronic Devices Laboratory (2)*
A laboratory course associated with Electrical Engineering 148. Laboratory fee, \$10.
- 171 *Modern Computing Machines (3)*
Introduction to modern computing machines. Basic principles, number systems, arithmetic, control, programming, types of machines and principles of operation. Prerequisite: Electrical Engineering 137, Statistics 158, and Mathematics 203.
- 172 *Machine Computer Circuitry (3)*
Theory, counting, control circuits. Relation of mathematical operations to circuitry. Basic circuit and switching circuits. Prerequisite: Electrical Engineering 115, Physics 132.
- 187-90 *Proseminar in Electrical Engineering (1-1)*
Prerequisite: Electrical Engineering 138.
- 201 *Radio Wave Propagation (3)*
Theory of the radiation and propagation of electromagnetic waves in space, with consideration of practical application to radio problems.
- 202 *Microwave Electronics (3)*
Behavior of vacuum tubes at ultrahigh frequencies. Theory and applications of microwave oscillators and transmission circuits. Microwave problems.
- 203 *Operational Analysis of Linear Systems (3)*
Analysis of circuits and/or fluid systems and transient conditions by operational methods. Generators of the circuit concept.

206 *Electronic Circuit Problems* (3)

Analysis and design of low power vacuum tube and transistor circuits: amplifiers, oscillators, frequency modulators, mixers, counters, logic theory of instruments, electronic analysis.

207-507 *Thesis* (3-3)

MECHANICAL ENGINEERING

1 *Orientation* (1)

Open to freshmen only. Study rule, how to study, how to select problems, and the engineering profession.

3 *Mechanical Drawing* (2)

Drafting room fee, \$5. Drafting (6 hours).

4 *Descriptive Geometry* (2)

Drafting room fee, \$5. Drafting (6 hours).

7 *Machine Drawing* (2)

Prerequisite: Mechanical Engineering 3 and 4. Drafting room fee, \$5. Drafting (6 hours).

8 *Mechanism Drawing* (2)

Prerequisite: Mechanical Engineering 3, 4, and 11. Prerequisite for Engineering 10. Drafting room fee, \$5. Drafting (6 hours).

13-14 *Mechanism* (2-2)

Prerequisite: Mathematics 17. Prerequisite for concurrent lecture: Mathematics 20.

111-112 *Thermodynamics* (3-3)

With introductory study of laws of heat transmission. Prerequisite: Junior status.

115-116 *Mechanical Laboratory* (2-2)

Calibration of instruments; kinematics; testing of prime mover efficiency; combustion engines; and refrigeration machines. Experiments available for credit: Mechanical Engineering 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

120 *Methods of Manufacture* (2)

Foundry practice, pattern making, sand casting, lost wax casting, investment casting, die casting, forging, extrusion, rolling, drawing, sheet metal forming. Prerequisite: Mechanical Engineering 8 and 11; Civil Engineering 2.

127-28 *Machine Design* (2-2)

With comprehensive computerization and design projects (6 hours). Prerequisite: Mechanical Engineering 7, 8, and 112; Civil Engineering 10, and 147. Drafting room fee, \$5 a term.

- 127-30 *Power Plants* (3-3)
Study of design, layout, installation, and operation of power plants and equipment, with emphasis on heat transmission and instrumentation. Prerequisite: Mechanical Engineering 112.
- 131-32 *Heating, Ventilating, Air Conditioning, and Refrigeration* (2-2)
Principles and applications. Prerequisite: Mechanical Engineering 112; Civil Engineering 20 and 137.
- 133 *Combustion Engines* (2)
Study of spark-ignition and compression-ignition engines, combustion performance, fuels, knock, supercharging and combustion charts. Inspection trips required. Prerequisite: Mechanical Engineering 112; senior status.
- 139 *Fluid Dynamics* (3)
Theory and application of fluid mechanics. Prerequisite: Mechanical Engineering 112; Civil Engineering 135.
- 140 *Mechanical Vibrations* (3)
Inertia effects, balancing, vibration phenomena. Prerequisite: Mechanical Engineering 7, 8, and 14; Civil Engineering 140.
- 141-42 *Management Problems* (2-2)
Organization of an industrial enterprise, the handling and training of men.
- 217-218 *Proseminar in Mechanical Engineering* (1-1)
Prerequisite: Speech 1; senior status.
- 201 *Instrumentation* (3)
Theory of measurement and instrumentation systems. Physical principles involved in research and commercial instrumentation. Design problems.
- 202 *Advanced Dynamics of Machinery* (3)
Free, damped, and forced vibrations of mechanical systems; the dynamic response of elastic systems. Selected topics in vibration isolation and control.
- 203 *Advanced Fluid Dynamics* (3)
Advanced mechanics of real and ideal fluids, turbulence, boundary layer mechanics, hydrodynamic lubrication, heat transfer.
- 204 *Heat Transfer Thermodynamics* (3)
Advanced problems in comparison of gases and liquids; conduction. Heat transfer problems involving radiation, convection, conduction, convection, and conduction.
- 217-218 *Seminar in Engineering* (1-1)
- 219-300 *Thesis* (3-3)

ENGINEERING ADMINISTRATION

The School of Engineering also offers the following courses primarily for candidates for the degree of Master of Engineering Administration. Other courses in this program are listed under the departments of Accounting, Business Administration, Geography, and Psychology.

Engineering Administration 101	<i>Engineering Law</i> (3)
Engineering Administration 205	<i>Engineering and Society</i> (3)
Engineering Administration 211-12	<i>Communication</i> (3-5)
Engineering Administration 251	<i>Management of Research and Development</i> (3)
Engineering Administration 252	<i>Production and Maintenance Management</i> (3)
Engineering Administration 260	<i>Statistics, Quality Control, and Standardization</i> (3)
Engineering Administration 261	<i>Economic Analysis in Engineering Planning</i> (3)
Engineering Administration 271	<i>Operations Research</i> (3)
Engineering Administration 272	<i>Operations Research—Problems</i> (3)
Engineering Administration 292	<i>Problems in Engineering Administration</i> (3)

REQUIRED AND ELECTIVE COURSES FROM OTHER DEPARTMENTS

On the following pages appears a partial list of courses in other departments of instruction which are closely related to engineering. Some of these courses are prescribed in the several curricula of the School of Engineering; all are recommended as suitable elective subjects for engineering students.

ACCOUNTING

1-2 *Introductory Accounting* (3-3)

Basic principles underlying accounting records, presentation of financial statements and financial statements, introduction to cost accounting and valuation, and income determination policies.

1-1 *Cost Accounting* (3)

Theory and purposes of industrial and commercial systems of cost control and determination, analysis and interpretation of cost data.

- 111 *Financial Statement Analysis* (3)
Methods and techniques of preparing, analyzing and interpreting financial statements. Determination and interpretation of trends and ratios.

- 113 *Business Budgeting* (3)
Principles, preparation, and administration of a business budget.

AIR SCIENCE

- 1-2 *Air Science I—Freshman Year* (2-2)
31-32 *Air Science II—Sophomore Year* (2-2)
1-1-2 *Air Science III—Junior Year* (3-3)
131-32 *Air Science IV—Senior Year* (3-3)

BUSINESS ADMINISTRATION

- 1-1 *Business Organization and Combination* (3)
Simple and interrelated forms of business enterprise and their control by government.
- 1-5 *Personnel Management in Industry* (3)
Organization and work of the personnel department, human relations in business.
- 1-6 *Problems in Personnel Management* (3)
Illustrated by cases drawn from business and industry.
- 1-9 *Office Management* (3)
Organization and layout of an office, use of office machines and supplies, planning and execution of work, supervisory problems.
- 1-21 *General Insurance* (3)
Principles of property, life, marine, and casualty insurance; the function of insurance in the economic life of a business and individual.
- 1-31 *Business Finance* (3)
Principles of financing business enterprises. Prerequisite: Accounting 1-2.
- 1-41 *Principles of Marketing* (3)
Survey of marketing, wholesale, distribution, retailing, wholesaling, and sales management; entire marketing structure and its relation to the total economy.
- 1-45 *Sales Management* (3)
Organization of sales department, sales planning and forecasting, sales territories, performance standards, incentive and control of distribution costs. Prerequisite: Business Administration 141.

150 *Principles of Purchasing* (3)

Orientation for purchasing, purchasing policies, market relations, selection of merchandise, purchasing information and records.

CHEMISTRY

†11-12 *General Chemistry* (4-4)

Prerequisite: one year of high school science. Laboratory fee, \$10 a term. Lecture, laboratory, and recitation.

21 *Qualitative Inorganic Analysis* (4)

Prerequisite: Chemistry 12. Laboratory fee, \$10.50. Lecture and laboratory.

22 *Quantitative Inorganic Analysis I* (4)

Prerequisite: Chemistry 21. Laboratory fee, \$10.50. Lecture and laboratory.

†111-12 *Physical Chemistry Lectures* (3-3)

Students registering for Chemistry 111-12 must register concurrently for Chemistry 113-14 unless they already have credit for physical chemistry laboratory. Prerequisite: Chemistry 22 and 152. Mathematics 20. Physics 5.

†113-14 *Physical Chemistry Laboratory* (2-2)

Laboratory to accompany Chemistry 111-12. Students registering for Chemistry 113-14 must register concurrently for Chemistry 111-12 unless they already have credit for lectures in physical chemistry. Laboratory fee, \$10.50 a term.

122 *Quantitative Inorganic Analysis II* (4)

A continuation of Chemistry 22. Prerequisite: Chemistry 22. Laboratory fee, \$10.50. Lecture and laboratory.

135 *Inorganic Chemistry: Preparations* (2)

Prerequisite: Chemistry 152; prerequisite or concurrent registration Chemistry 111-12 and 113-14. Laboratory fee, \$10.50.

†151-52 *Organic Chemistry* (4-4)

Chemistry of the carbon compounds. Prerequisite: Chemistry 21. Chemistry 151 laboratory fee, \$10. Chemistry 152 laboratory fee, \$10.50. Lecture and laboratory.

155 *Organic Chemistry: Preparations* (2 or 3)

The synthesis of organic compounds and the application of the techniques of organic chemistry to the preparation of pure compounds using larger amounts and greater refinements than in Chemistry 151-52. Prerequisite: Chemistry 22 and 152. Laboratory fee, \$10.50 credit hour.

ECONOMICS*

1-2 *Principles of Economics* (3-3)

Survey of the major economic principles, institutions, and problems in contemporary economic life. Economics 1 is prerequisite to Economics 2.

* Economics 1-2 is prerequisite to all other courses in Economics.

- 101-2 *Economic Analysis* (3-3)
Analysis of demand, supply, and commodity pricing; theory of national income determination; pricing of productive services; welfare economics. Economics 101 is prerequisite to Economics 102.
- 121 *Money and Banking* (3)
Theory of money, credit, and banking; commercial banking and the Federal Reserve System; other financial institutions; international aspects of money; current financial problems.
- 141-42 *Labor Economics* (3-3)
Wages, hours, and employment; labor organizations; labor legislation; and federal administrative boards.
- 171 *Economics of Transportation* (3)
History, organization, competition, rates, and regulation of motor, air, rail, and water carriers.
- 172 *Economics of Public Utilities* (3)
Regulation, valuation, rate making, development, and public policy.

ENGLISH

- 1 *English Composition** (3)
Review of grammar, exercises in composition, readings.
- 2 *English Composition** (3)
Exercises in composition, readings. The second term of the six-hour English Composition course required of all students.
- 11 *The Writing of Reports* (3)
Theory and practice in the writing of technical reports. Prerequisite: English 1, 2.

MATHEMATICS

- 3 *College Algebra* (3)
Prerequisite: one year each of high school algebra and high school geometry.
- 6 *Plane Trigonometry* (3)
Prerequisite: two years of high school algebra and one year of high school geometry or Mathematics 3 (or concurrent registration therefor).
- 12 *Analytic Geometry* (3)
Prerequisite: Mathematics 3 and 6, or two years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry.

* Before students are registered in English 1, they are tested in the minimum exercises of vocabulary, spelling, grammar, standard usage, and writing skills. Those students who show sufficient competency may, upon passing further tests, be exempted from one or both terms of the English Composition course; those who are inadequately prepared for English 1 will be assigned to English 1A.

- 19 *Differential Calculus* (3)
Prerequisite: Mathematics 12.
- 20 *Integral Calculus* (3)
Prerequisite: Mathematics 19.
- 102 *Fundamental Concepts of Mathematics* (3)
- 103 *Calculus and Differential Equations* (3)
Prerequisite: Mathematics 2.
- 112 *Mathematics for Engineers and Scientists* (3)
Topics from advanced calculus, partial differential equations, vector analysis, and complex variables. Prerequisite: Mathematics 112 or 113.
- 123 *Theory of Equations* (3)
- 125 *Advanced Algebra* (3)
- 126 *Advanced Analytic Geometry* (3)
- 132 *Differential Equations* (3)
- 134 *Introduction to Boundary Value Problems* (3)
Prerequisite: Mathematics 133 or 132.
- †135-36 *Projective Geometry* (2-2)
- 139 *Advanced Calculus* (3)
- 140 *Introduction to Analysis* (3)
- 141 *Introduction to Infinite Series* (3)
- 167 *Fourier Series and Spherical Harmonics* (3)
Prerequisite: Mathematics 132.
- 205-06 *Modern Algebra* (3-3)

PHYSICAL EDUCATION

- 1-2 *Freshman Physical Education* (1-1)
Locker and towel fee, \$4.
- 11-12 *Sophomore Physical Education* (1-1)
Locker and towel fee, \$4.

PHYSICS

- 5 *General Physics* (3)
Light, heat, force, energy, and the properties of matter. Prerequisite: High school algebra and plane geometry. Material fee, \$10. Lecture laboratory, and recitation.

6 *General Physics (3)*

Mechanics, wave-motion and sound. Prerequisite: Physics 5*; high school algebra and plane geometry. Material fee, \$10. Lecture, laboratory, and recitation.

7 *General Physics (3)*

Elementary electricity and magnetism. Prerequisite: Physics 5*; high school algebra and plane geometry. Material fee, \$10. Lecture, laboratory and recitation.

8 *General Physics (3)*

This course is the fourth in the sequence of courses 5, 6, 7, and 8, and emphasizes the connection between the fundamental principles studied in courses 5, 6, and 7, and the phenomena and theories of modern physics. Topics considered include electromagnetic waves (radio, radio, and X-rays), atomic and molecular structure, radioactivity, nuclear physics, the quantum theory of matter and radiation, and the elementary particles such as electrons, protons, neutrons, and mesons. Prerequisite: Physics 6 and 7.

55 *Physical Measurements (3)*

Theory and methods of precise measurement. Prerequisite: Physics 6 and 7; Mathematics 12. Material fee, \$10. Lecture and laboratory.

102 *Heat and Thermodynamics (3)*

Thermometry, calorimetry, heat conduction, the laws of thermodynamics with application to physical systems. Prerequisite: Physics 8; Mathematics 2.

105 *Principles of Electricity (3)*

Electricity and magnetism; circuit theory, including elementary alternating-current circuits, terrestrial magnetism; atmospheric electricity. Prerequisite: Physics 8; Mathematics 20.

106 *Optics (3)*

Geometrical optics; elementary theory of wave motions; interference, diffraction, polarization, and dispersion of light; laws of black-body radiation. Prerequisite: Physics 8; Mathematics 20.

113 *Atomic Physics (3)*

Properties of the electron and the other fundamental particles of physics; the photoelectric effect, X-rays and crystal structure, wave aspects of particles, elements of the quantum theory, atomic spectra and atomic structure. Prerequisite: Physics 8; Mathematics 20.

114 *Statistical Physics (3)*

Applications of classical and quantum statistics to the physics of gases, liquids, and solids. Topics discussed include fluctuations in gases and liquids, comparison of theory, specific heats of solids, and experimental errors. Prerequisite: Physics 113.

* This prerequisite may be waived for students who have passed the 2-hour general Physics exam which is given at the University of Illinois, Urbana, and the University of Chicago, Chicago, Ill. in the fall semester of the University calendar.

- 123 *Nuclear Physics* (3)
Structure and stability of atomic nuclei, spontaneous transformations, nuclear reactions, astrophysical applications, nuclear fission. Prerequisite: Physics 113.
- 128 *Sound* (3)
Production, propagation, and detection of sound waves; vibrations of sounding bodies; acoustic instruments and acoustic measurements. Prerequisite: Physics 8; Mathematics 20.
- 132 *Electronics* (3)
The phenomena of electron emission from solids; the physical properties of electron tubes, and the principles underlying their basic applications. Prerequisite: Physics 8 and 55, and Physics 105 or Electrical Engineering 12. Material fee, \$10. Lecture and laboratory.
- 133 *Electronic Circuits* (3)
A continuation of Physics 132. Includes basic radiofrequency applications of electron tubes, and special types of tubes such as klystrons, magnetrons, and masers. Lectures and problems. Prerequisite: Physics 132; Electrical Engineering 107.
- 155-56 *Advanced Physical Measurements* (3-3)
Optional programs of experiments in electricity and magnetism, optics, or atomic physics. Corresponding prerequisites are Physics 105, 106, or 113, or the equivalent. In addition, Physics 55 is a general prerequisite. Material fee, \$10.

POLITICAL SCIENCE*

- 9-10 *Government of the United States* (3-3)
- 127 *Commercial Law: Contracts, Sales, Agency, and Bailments* (3)

SPEECH

- 1 *Effective Speaking* (3)

STATISTICS

- *91-92 *Principles of Statistical Methods* (3-3)
Prerequisite: one entrance unit in a math. Laboratory fee, \$8 a term. Lecture and laboratory.
- 111 *Business and Economic Statistics I* (3)
Characteristic values, measures of variability, sampling processes, sampling distributions, and simple correlation. Admission by permission of the instructor.

*Political Science 9-10 is prerequisite to all other courses in Political Science.

- 112 *Business and Economic Statistics II* (3)
Module and spatial regression, time series analysis, index numbers, linear regression, demand estimation, and depreciation schedules. Prerequisite: Statistics 111 or the equivalent.
- 117 *Analysis of Variance* (3)
Prerequisite: Statistics 91-92.
- 118 *Correlation and the Chi-Square Test* (3)
Prerequisite: Statistics 91-92.
- *152-56 *Mathematical Probability* (3-3)
Prerequisite: Mathematics 29 and Statistics 91-92.
- *157-58 *Mathematical Statistics* (3-3)
Prerequisite or concurrent enrollment: Statistics 155-56.

ALUMNI AND ALLIED ASSOCIATIONS

THE GENERAL ALUMNI ASSOCIATION

The objects of this Association are to unite the graduates in closer sympathy and to promote the general welfare of the University. The following persons are eligible for *active* membership: graduates of any college, school, or division of the University; holders of honorary degrees from the University; and members of the Board of Trustees and of the Faculty of the University. Any person who has matriculated who has been in regular attendance for one year, and who has left the University in good standing, is eligible for *associate* membership.

The Alumni Office is situated at 2018 I Street, Washington, D. C. Alumni are urged to keep the office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

THE ENGINEER ALUMNI ASSOCIATION OF THE GEORGE WASHINGTON UNIVERSITY

The Engineer Alumni Association was organized in 1936 and has been affiliated with the General Alumni Association since that time. Its objects are to unite the graduates and Faculty of the School of Engineering in closer fellowship, to promote the general welfare of the School of Engineering and of the University at large, to foster activities of the engineering organizations recognized by the University, and to advance the profession of engineering in general.

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Abstract: The purpose of this study was to determine the effect of a 12-week training program on the physical fitness and health of middle-aged men. The study was conducted in a community center in a large city. The participants were 40 men aged 40-50 years, who were divided into two groups: a control group and an experimental group. The experimental group participated in a 12-week training program consisting of aerobic and strength exercises. The control group did not participate in any training program. The physical fitness and health of the participants were measured at the beginning and at the end of the 12-week period. The results showed that the experimental group had significantly higher levels of physical fitness and health than the control group at the end of the 12-week period. The findings suggest that a 12-week training program can improve the physical fitness and health of middle-aged men.

THE SCHOOL OF EDUCATION

1955-56

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UNIVERSITY
BULLETIN

VOL. LIV

No. 6

THE SCHOOL OF EDUCATION

WASHINGTON, D. C.

PUBLISHED IN JULY
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BY THE UNIVERSITY



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CALENDAR

1955-56

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CALENDAR OF THE SCHOOL OF EDUCATION 1955-56

Date	Day	Observance
1955		
First TERM		
Sept. 19	Monday	Orientation assembly for all new students
Sept. 20	Tuesday	Curriculum assembly for all new students
Sept. 22 and 23	Thursday and Friday	Registration
Sept. 26	Monday	Assign your books
Oct. 7	Friday	Final subjects of February Master's candidates due
Oct. 14	Friday	Dissertation subjects of June Doctoral candidates due
Oct. 15	Saturday	Applications for Doctoral and Master's October comprehensive examinations due
Oct. 22	Saturday	Comprehensive examinations for Doctoral and Master's candidates
Oct. 28	Friday	Release of Arts activities plans due
Nov. 4	Friday	Meeting of Committee on Graduate Studies
Nov. 11	Friday	Fall Convocation Holiday
Nov. 24-26	Thursday through Saturday	Thanksgiving recess
Dec. 3	Saturday	Applications for Doctoral and Master's January comprehensive examinations due
Dec. 19-Jan. 2	Monday through Monday	Christmas recess
Jan. 3	Tuesday	Classes resume
Jan. 7	Saturday	Thesis of Master's candidates due
Jan. 18	Wednesday	Dissertation of February Doctoral candidates due
Jan. 20	Friday	Comprehensive examinations for Doctoral and Master's candidates due
Jan. 23-24	Monday through Tuesday	Last day of classes for the fall term
Jan. 25-26	Wednesday through Thursday	Meeting of Committee on Graduate Studies
Second TERM		
Feb. 2 and 3	Thursday and Friday	Fall term examination period
Feb. 6	Monday	Registration
Feb. 17	Friday	Assign courses for the spring term
Feb. 22	Wednesday	Final subjects for June Master's candidates due
March 5	Monday	Western Convocation Holiday
		Activities plans for June Bachelor of Arts candidates opening the School of Education in February

CALENDAR OF THE SCHOOL OF EDUCATION—Continued

Date	Day	Occasion
March 10 ..	Saturday	Dissertation subjects of November
March 30 ..	Friday through	Doctoral candidates due
April 4 ..	Wednesday	Easter recess
April 5	Thursday	Applications for Doctoral and Master's April comprehensive examinations due
April 13	Friday	Dissertation subjects for February Doctoral candidates due
April 20	Friday	Meeting of Committee on Graduate Studies
April 21	Saturday	Comprehensive examinations for Doctoral and Master's candidates
May 4	Friday	Theses of June Master's candidates due
May 16	Wednesday	Last day of classes for the spring term
May 21-29 ..	Monday through Tuesday	Spring term examination period
June 3	Sunday	Baccalaureate
June 6	Wednesday	Commencement
SUMMER TERM		
June 11	Monday	Registration and first day of classes of the pre-session
June 18	Monday	Registration for the eight-week term
June 19	Tuesday	Classes begin for the eight-week term
June 29	Friday	Pre-session ends
July 2	Monday	Registration and first day of classes of the six-week session
July 4	Wednesday	Independence Day. Holiday
July 18	Wednesday	Applications for Doctoral and Master's July comprehensive examinations due
		Meeting of Committee on Graduate Studies
July 25	Wednesday	Comprehensive examinations for Doctoral and Master's candidates
Aug. 10	Friday	Six-week session ends
Aug. 13	Monday	Eight-week term ends
		Theses of November Master's candidates due
		Registration and first day of classes of the post-session
Aug. 31	Friday	Post-session ends
Sept. 7	Friday	Dissertations of November Doctoral candidates due
Sept. 20 and 21	Thursday and Friday	Registration for the fall term of the academic year 1956-57

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Burnice Herman Jarman

1957

Don Carlos Faith
Joseph Henry Krupa

1958

Helen Bennett Lawrence
Kathryn Mildred Towne

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Blake Smith Root
Anthony Charles La Bue

Thelma Hunt
Don Carlos Faith
Ralph Windsor Ruffner
Grover LaMarr Angel

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Harold Griffith Sutton
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Kathryn Mildred Towne
Vincent James DeAngelis

* The President of the University and the Dean of the School of Education are members ex officio of all committees.
† Elected by the Faculty.

GENERAL INFORMATION

INTRODUCTORY

It is the purpose of the School of Education to prepare teachers, supervisors, and administrators for the higher ranges of educational service and to offer opportunities to teachers of experience to extend their education. The School includes the departments of Education, Physical Education, and Home Economics.* It offers both graduate and undergraduate work. Other departments of the University provide general education and subject-matter courses needed for a well-balanced program of teacher education.

The schedule of courses is arranged to meet the convenience of both full-time and part-time students. By attending evening, Saturday, and summer classes, teachers in the schools of the metropolitan Washington Area and others within commuting range may complete all the requirements for a degree without giving up their positions.

HISTORICAL DEVELOPMENT

The University began offering professional courses for teachers in 1904-5 and in 1907 it established a Division of Education. In 1909, the Division of Education became the Teachers College which, in its early years, was concerned largely with teacher preparation on the undergraduate level.

In 1928, the Teachers College became the School of Education and greater provision was made for advanced study. Since that time the graduate enrollment has steadily increased with the result that today the School has a considerably larger number of graduate than undergraduate students.

ADVANTAGES OF STUDY IN THE NATION'S CAPITAL

Washington is rich in the resources needed by teachers to supplement classroom instruction. In addition to the library facilities of the University, the Library of Congress, the Library of the Department of Health, Education, and Welfare, and many special collections provide unexcelled opportunities for reading and research. The operation of all branches of the National Government may be observed. Among the art galleries are the National Gallery of Art, the Corcoran Gallery of Art, the Freer Art Gallery, Phillips Memorial Gallery, and the National Museum. The music calendar of Washington is a full one, and includes con-

* The Department of Home Economics offers a curriculum in home-making. Its program is described in a special announcement.

certs by the National Symphony Orchestra, Philadelphia Orchestra, and the Boston Symphony Orchestra. Those interested in science find many resources for study at the National Museum, the National Zoological Park, the United States Botanic Garden, and the Aquarium of the Fish and Wildlife Service, Department of the Interior. Teachers have unique opportunities to become acquainted with the work of the Office of Education, the National Education Association, the American Council on Education, and many other national organizations with headquarters in Washington.

ACADEMIC STATUS

The George Washington University is accredited by the regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. This is important to students who wish to transfer credits from one institution to another.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The School of Education is accredited by the National Council for the Accreditation of Teacher Education, is a member of the American Association of Colleges for Teacher Education, and was a charter member of the National Association of Colleges and Departments of Education prior to the merger of that association with others to form the American Association of Colleges for Teacher Education.

THE EDUCATION OF TEACHERS

PROGRAMS LEADING TO THE DEGREE OF BACHELOR OF SCIENCE IN PHYSICAL EDUCATION

BACHELOR OF SCIENCE IN PHYSICAL EDUCATION FOR MEN

There are three curricula leading to this degree. The Single-Major and Subject-Certification Teacher's Curriculum is designed to prepare students for teaching positions in smaller schools where it is necessary to teach an academic subject in addition to physical education. The Single-Major Teacher's Curriculum prepares for the teaching of physical education in the larger schools. The Physical Education and Recreation Curriculum has been planned for those who wish to be prepared to direct programs of recreation in addition to the teaching of physical education.

The following courses, to be taken in the Junior College, are required for admission to the School of Education. Students with deficiencies must make up those deficiencies as prerequisite to the Junior College curriculum.

	Credit Hours
English	6
Social Studies	6
Science	6 or 8
Physical Education Curriculum Requirements	18
Elective*	8
Total	66

The minimum requirements for this degree are 66 credit hours, distributed as follows:

Single-Major and Subject Certification Teacher's Curriculum

The minimum requirements for this degree are twenty-one credit hours in education, twenty-four credit hours in physical education.

*Credit is not used for courses created in required Physical Education or Secretarial Studies

eighteen credit hours in an academic teaching field, and three credit hours in physiology, distributed as follows:

JUNIOR YEAR		SENIOR YEAR	
	Credit Hours		Credit Hours
Learning and Teaching	6	Common Teaching Skills	3
Survey and the School	6	Observation and Student Teaching	6-9
History and Principles of Physical Education	3	Methods and Materials for Teaching Team Sports in Secondary Schools	4
Comparative Physical Education and Physical Examinations	3	Methods and Materials of Health Education	3
Techniques for Teaching Recreation and Dance	1	Tests and Measurements in Physical Education	3
Methods and Practice in Teaching Physical Education Activities	4	Organization and Administration of Physical Education	3
Physiology	3	Academic teaching field	11
Academic teaching field	7		
Total	33	Total	33

Single-Major Teacher's Course

The minimum requirements for this degree are twenty-one credit hours in education, twenty-eight credit hours in physical education, three credit hours in physiology, and fourteen credit hours of electives:

JUNIOR YEAR		SENIOR YEAR	
	Credit Hours		Credit Hours
Learning and Teaching	6	Common Teaching Skills	3
Survey and the School	6	Observation and Student Teaching	6-9
History and Principles of Physical Education	3	Comparative Physical Education and Physical Examinations	3
Techniques for Teaching Recreation and Dance	1	Methods and Materials for Health Education	3
Methods and Practice in Teaching Physical Education Activities	4	Tests and Measurements in Physical Education	3
Physiology	3	Organization and Administration of Physical Education	3
Electives	4	Electives	9-12
Total	33	Total	33

Physical Education and Recreation Curriculum

The minimum requirements for this curriculum are 66 credit hours, distributed as follows:

JUNIOR YEAR		Credit Hours	SENIOR YEAR		Credit Hours
Learning and Teaching	3	3	Common Teaching Skills	3	3
Society and the School	6	6	Observation and Student Teaching	6	6
Introduction to Recreation	2	2	History and Principles of Physical Education	3	3
Techniques for Teaching Recreation, Dance	1	1	Methods and Materials for Health Education	3	3
Leadership Organization in the Intramural Program	4	4	Tests and Measurements in Physical Education	3	3
Methods and Practice in Teaching Physical Education Activities ..	4	4	Organization and Administration of Physical Education	3	3
Camp Leadership	1	1	Community Organization for Recreation	3	3
Recreational Leadership Activities ..	6	6	Administration of Community Recreation Programs	3	3
Electives	6	6	Electives	3	3
Total	33	33	Total	33	33

BACHELOR OF SCIENCE IN PHYSICAL EDUCATION FOR WOMEN

There are three curricula leading to the degree. The Dual-Major Teacher's Curriculum is designed to prepare students for positions in smaller schools where it is necessary to teach an academic subject in addition to Physical Education.

The Single-Major Teacher's Curriculum prepares for the teaching of Physical Education in the larger schools. Within this curriculum there is opportunity for specialization in dance, sports, or correctives.

The Physical Education and Recreation Curriculum has been planned for those who wish to be prepared to direct programs of recreation in addition to teaching Physical Education.

The following courses, to be taken in the Junior College, are required for admission to the School of Education:

English	English 51-52, 71-72, or 91-92	4
Social Studies	History 39-40, 71-72; Political Science 9-10; or Sociology 1-2	4
Science	Biology 1-2 or Zoology 1-2	4
Physical Education	Physical Education 43-44 (Freshman year)	4
Requirements	Physical Education 45, 51-52, Psychology 1, 2 (Sophomore year)	8
Academic Elective* (Each year) .....	.....	12
Total .....	.....	24

* Credit is not given for Secondary Studies I or II.

Dual- or Single-Major Teacher's Curriculum

The student desiring to prepare herself to teach another subject in addition to Physical Education for Women may do so by choosing her elective hours from one subject-matter field with the advice of the Dean of the School of Education. Relevant work completed in the Junior College may be counted in this subject-matter field.

JUNIOR YEAR		SENIOR YEAR	
	Credit Hours		Credit Hours
Learning and Teaching	6	Society and the School	6
First Aid and Care of Athletic Injuries	2	Observation and Student Teaching	6-7
Physical Education in the Elementary School	3	Methods and Practice in Teaching Physical Education Activities	4
History and Principles of Physical Education	3	School and Community Health Programs	3
Physical Education and Physical Examinations	6	Methods and Materials of Health Education	3
Techniques for Teaching Recreation	1	Tests and Measurements in Physical Education	3
Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges	2	Organization and Administration of Physical Education	3
Methods of Teaching Modern Dance	1	Electives	3-6
Physical Education	1	Total	34
Camp Leadership	1		
Physical Leadership	1		
Physical Education	3		
Physical Education	3		
Total	32		

Physical Education and Recreation Curriculum

JUNIOR YEAR		SENIOR YEAR	
	Credit Hours		Credit Hours
Introduction to Recreation	2	Society and the School	6
First Aid and Care of Athletic Injuries	2	Observation and Student Teaching	6-7
Physical Education in the Elementary School	3	History and Principles of Physical Education	3
Physical Education and Physical Examinations	6	Methods and Practice in Teaching Physical Education Activities	4
Techniques for Teaching Recreation	1	Methods and Materials of Health Education	3
Physical Education in the Elementary School	4	Camp Leadership	1
Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges	2	Organization and Administration of Physical Education	3
Methods of Teaching Modern Dance	1	Community Organization for Recreation	3
Physical Education	1	Administration of Community Recreation Programs	3
Camp Leadership	1	Total	32-35
Physical Leadership	6		
Physical Education	3		
Physical Education	3		
Total	34		

PROGRAMS LEADING TO THE DEGREE OF BACHELOR OF ARTS IN EDUCATION

Programs leading to the degree of Bachelor of Arts in Education have four main objectives: (1) provision of general educational backgrounds, (2) a functional command of ideas, concepts, knowledges, and skills in one or more teaching fields, (3) a mastery of basic professional information and skills adequate for a beginning teacher, and (4) development of attitudes needed for success in teaching. Since the contents of teaching fields differ in scope and complexity, some programs are longer than others in terms of credit hours. None require less than 120 credit hours of satisfactory work, exclusive of required Physical Education.

Normally, 60 credit hours of the total requirement are completed in the Junior College of the University or in an equivalent institution elsewhere.

GENERAL EDUCATION

The general educational backgrounds needed by prospective teachers are obtained through: (1) pre-college education, (2) college courses, (3) work experience, (4) leadership activities, (5) participation in student campus activities, and (6) utilization of off-campus cultural opportunities.

College course requirements.—Course requirements depend in part upon the senior high school credits presented for college admission. They are as follows:

ENGLISH

English 1, 2—English Composition
Before students are registered in English 1, they are tested in the minimum essentials of vocabulary, spelling, grammar, standard usage, and writing skill. Those students who show marked superiority may, upon passing further tests, be exempted from one or both terms of the English Composition course; those who are inadequately prepared for English 1 will be assigned to English A. English 1 is a prerequisite to all other courses in English.

One of the following survey courses in literature

English 51-52—Introduction to English Literature
English 71-72—Introduction to American Literature
English 91-92—Introduction to European Literature

FOREIGN LANGUAGES

French, German, Latin, Russian, or Spanish

A student offering for admission four consecutive high school units of a single foreign language, or the equivalent, is not required to take any foreign language. If he offers three units, he must complete the second term of the second-year college course in the same language. If he offers two units, he must complete the entire second-year college course in the same language. If he offers one unit, he must complete the second term of the first-year college course and the second-year course in the same language.

Credit
Hours

12

SOCIAL STUDIES

History 71-72: The Development of the Civilization of the United States	6
Another Social Science chosen from the following courses.....	6
Economics 1-2: Principles of Economics	
Geography 51, 52: Introduction to Geography, World Regions	
History 39-40: The Development of European Civilization	
Political Science 9-10: Government of the United States	
Religion 59-60: History of Religions	
Sociology 1-2: Introductory Sociology	

A student offering for admission two or more acceptable senior high school units in the Social Studies may be exempted from the second part of this requirement.

SCIENCE AND MATHEMATICS

Two terms of science or mathematics to supplement senior high school courses in these fields and chosen from the following.....	6-8
Biology 1-2: Survey in Biology	
Botany 1, 2: Structure and Functions of the Flowering Plant; Survey of the Plant Kingdom	
Chemistry 3-4: Survey of Physical Sciences	
Chemistry 11-12: General Chemistry	
Mathematics 3 and 6: College Algebra; Plane Trigonometry	
Mathematics 6 and 12: Plane Trigonometry; Analytic Geometry	
Physics 5 and 6, or 6 and 7: General Physics	
Zoology 1-2: Introduction to Zoology	

OTHER COURSES

Psychology 1: General Psychology	3
Psychology 22: Educational Psychology	3
Psychology 29: Child Psychology	3
Speech 1: Effective Speaking	3
Speech 11: Training of the Speaking Voice	3

Students who demonstrate marked superiority in Speech may be exempted from this requirement. Such exemption is granted only on the recommendation of the Department of Speech.

Statistics 53: Introduction to Statistics in Psychology and Education

3

ACADEMIC ELECTIVES

Electives may be increased through the various exemptions

PHYSICAL EDUCATION

Physical Education 1-2 and 11-12	
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A student may be exempted from this requirement if registered for less than three courses or regularly employed during the day.

Minimum required credits

Work experience, leadership activities, participation in student campus activities, and the utilization of off-campus cultural opportunities.— Obviously, these cannot be prescribed. Nevertheless, they constitute an important part of the general educational background of prospective

* Required for those preparing for elementary school teaching

teachers. In conference with a staff member of the Department of Education assigned as his general adviser, the student is expected to plan adequate experiences in these areas. Not later than one month after matriculation in the School of Education the student must file in the Office of the Dean a statement of such plans approved by his adviser. He must also keep his adviser informed concerning the fulfillment of his plans and to this end include in plans filed, scheduled conferences with his adviser.

Success of the student in enriching his general educational background by these means will be taken into consideration at the end of the first term of the junior year when the faculty will review the qualifications of candidates to determine any who are not of sufficient promise as prospective teachers to warrant continuation of their candidacies. Success in these activities will also be considered when the list of candidates is again reviewed early in the last term of the senior year immediately after the results of the National Teacher Examinations are available. In estimating the success of the student in this connection, more weight will be given to evidence of initiative, eagerness to make the most of each experience, balance, and quality of experience than to the number of different experiences.

Although the student is not required to establish a program of non-academic activities until he becomes a degree candidate in the School of Education, he is advised to do so as soon as he enters the Junior College. To this end, he should consult with the Junior College adviser of students in the pre-Education curriculum soon after entering the Junior College. Whatever is accomplished in this connection while in the Junior College will reduce the obligations of the student after admission to the School of Education.

TEACHING-FIELD PREPARATION

Teaching-field preparation depends upon the kind of teaching position for which the student is preparing. Those planning to teach in elementary schools need a degree of competency in several fields. Those preparing to teach in junior or senior high schools must demonstrate competency in a major teaching field and a minor teaching field. Ordinarily, students preparing to teach in evening schools for adults are required to prove competency in only one teaching field.

The student should begin teaching-field preparation while in the Junior College and should make provision for it in planning his program of studies.

Teaching-field requirements include satisfactory completion of prescribed academic courses in one or more fields, a satisfactory score on the special field examination or the National Teacher Examinations, and satisfactory completion of the prescribed special methods courses.

Prescribed academic courses vary in number in accordance with the scope and complexity of the teaching field and the license requirements of the various states. Minimum academic course requirements for each major teaching field are listed on succeeding pages. Minor teaching-field requirements are somewhat less than those of a major field. They are determined in conference with an adviser.

The prescribed course in special methods is concerned primarily with methods of initiating, guiding, and evaluating learning experiences dealing with the content of the teaching field. It attempts to bring to the student specific suggestions drawn from the accumulated experience of successful teachers. However, in addition, the course reviews the teaching-field content currently in use in schools and the examination at the end of the course provides the final test of competency in the teaching field.

Prescribed Courses in the Various Teaching Fields

ART		Credit Hours
One two-term course from the following group		6
Art 121-22	World History of Art	
Art 131-32	Modern Art	
Art 141-42	History of Art Criticism	
Art 151-52	History of Art Criticism	6
Art 71-72	Introduction to the Arts of America	
Art 121-2	The Design of the Home	
Art 141-42	Interior Decoration	
Art 143	Folk Arts of America	
Art 151-52	Survey of the Arts of America	24
Art 67-68	Drawing and Painting—Life and Portrait	
Art 77-78	Drawing and Painting—Life and Portrait	
Art 103-104	Drawing and Painting—Life and Portrait	
Art 175-76	Drawing and Painting—Life and Portrait	
Art 179-80	Sculpture	
Art 181-84	Commercial Art	

BIOLOGY		
Biology 1-2	Survey in Biology	6
Biology 1	Structure and Functions of the Flowering Plant	3
Home Economics 1-2	Nutrition	3
Physiology 115	Physiology	3
Zoology 1-2	Introduction to Zoology	6
Zoology 1-2	Introduction to Zoology	12
Total		33

BUSINESS EDUCATION

Accounting 1: Introductory Accounting.....
 Economics 1-2: Principles of Economics.....
 Secretarial Studies 51: Business Correspondence.....
 Additional courses as prescribed in one of the following groups:

Group 1—Secretarial Studies

Secretarial Studies 2: Intermediate Typewriting.....
 Secretarial Studies 12: Intermediate Shorthand and Transcription.....
 Secretarial Studies 15: Advanced Shorthand, Typewriting, and Transcription.....
 Secretarial Studies 16: Secretarial Shorthand, Typewriting, and Transcription.....
 Secretarial Studies 54: Secretarial Practice.....

*All of the following courses are approved by the Adviser:

Accounting 2: Introductory Accounting.....
 Business Administration 101: Business Organization and Composition.....
 Business Administration 109: Office Management.....
 Business Administration 141: Principles of Marketing.....
 Business Administration 151: Retailing.....
 Economics 121: Money and Banking.....
 Political Science 127: Commercial Law.....
 Statistics 52: Mathematics of Finance.....

Group 2—

Bookkeeping, Business Arithmetic, and Business Law
 Accounting 2: Introductory Accounting.....
 Business Administration 101: Business Organization and Composition.....
 Business Administration 109: Office Management.....
 Political Science 127-28: Commercial Law.....
 Statistics 52: Mathematics of Finance.....

*Two of the following courses are approved by the Adviser:

Accounting 111: Financial Statement Analysis.....
 Business Administration 121: General Insurance.....
 Business Administration 131: Business Finance.....
 Business Administration 135: Insurance.....
 Economics 121: Money and Banking.....

Group 3—

Distributive Education
 Business Administration 141: Principles of Marketing.....
 Business Administration 142: Marketing Problems.....
 Business Administration 145: Sales Management.....
 Business Administration 151: Retailing.....
 *Four of the following courses are approved by the Adviser:
 Business Administration 34: Sales Management Problems.....
 Business Administration 117: Advertising.....
 Business Administration 15: Principles of Purchasing.....

*Not required for the degree.

Business Administration 158.	Traffic Management
Business Administration 175.	Introduction to Foreign Trade
Business Administration 176.	Exporting and Importing

Total.....

36

CHEMISTRY

Chemistry 11-12: General Chemistry	8
Chemistry 21: Qualitative Inorganic Analysis	4
Chemistry 22: Qualitative Inorganic Analysis	4
Chemistry 151-52: Organic Chemistry	8
Chemistry 191: History of Chemistry	2
One of the following:	8-10
Chemistry 111-12 and 113-14: Physical Chemistry	
Biochemistry 221-22: Biochemistry	

Total.....

34-36

ELEMENTARY EDUCATION

Education 113: Elementary School Art	3
Education 114: Elementary School Music	3
Education 128: Children's Literature	3
Physical Education 141: Physical Education in the Elementary School	3
Science as approved by the Advisory	6-14
History 71-72: Development of the Civilization of the United States	6
One of the following (each counting as approved by the Advisory):	12
Education 1-2: Principles of Education	
Geography 51, 52: Introduction to Geography, World Regions	
History 3-4: The Development of European Civilization	
Physical Science 9-10: Government of the United States	
Reading 50-51: History of Reading	
Science 1-2: Introductory Science	

Total.....

30-44

ENGLISH

English 1, 2: English Composition	6
English 52: Introduction to English Literature	3
English 71-72: Introduction to American Literature	6
English 125: The Evolution of Modern Speech	3
English 135-36: Shakespeare	3
Speech 11: Training the Speaking Voice	3
One of the following (each counting as approved by the Advisory):	3
English 126: The Appreciation of Literature	
English 151-52: The Romantic Movement	
English 161-62: Victorian Literature	
English 165-66: The Twentieth Century	
English 171-72: Studies in American Literature	
English 173-74: Major American Poets	
English 176: American Drama	
English 177-78: American Fiction	

*Not included in the minor.

English 182: The English Novel
English 199: Proseman

Total.....

FRENCH

French 1-2: First-year French 6
French 3-4: Second-year French 6
French 9-102: French Composition and Conversation 0
French 51-52: Survey of French Literature and Civilization 12
*Additional courses in French as approved by the Adviser 1

Total.....

GEOGRAPHY

Geography 51: Introduction to Geography 3
Geography 52: World Regions 3
Geography 1-3-4: Cartography 3
Geography 113: Geomorphology 3
Geography 114: Weather and Climate 3
Geography 151: Economic Geography of the United States 3
Geography 152: Political Geography of the United States 3

*Two of the following term courses.....

Geography 183: Northwest Europe
Geography 184: The Mediterranean
Geography 191: Middle America
Geography 192: South America
Geography 195: Eastern and Southeastern Asia
Geography 197: The Pacific
Geography 198: Australia

*Two of the following term courses.....

Geography 125: Economic Geography: Trade and Transportation
Geography 126: Economic Geography: Raw Materials
Geography 127: Economic Geography: Manufacture
Geography 128: Economic Geography: Agriculture
Geography 131: Conservation of Natural Resources
Geography 132: Land Use
Geography 141: Geography of Settlement
Geography 142: Urban Geography

Total.....

GERMAN

German 1-2: First-year German 6
German 3-4: Second-year German 6
German 51-52: Introduction to German Literature 12
*Additional courses in German as approved by the Adviser 1

Total.....

* Not required for the major

HISTORY

History 39-40: The Development of European Civilization	6
History 71-72: The Development of the Civilization of the United States	6
Six credit hours, as approved by the Adviser, from each of the following groups	18
Group 1—American History	
History 171-72: Social History of the United States	
History 173: Representative Americans	
History 174: Economic History of the United States	
History 181-82: Diplomatic History of the United States	
Group 2—European History	
History 109: Thought and Culture of the Western World I: Ancient Civilization	
History 110: Thought and Culture of the Western World II: The Middle Ages and the Renaissance	
History 130: Nationalism	
History 145-46: Russian History	
History 147: Economic History of Europe	
History 149-50: European Diplomatic History	
History 151-52: English History	
Group 3—Latin American History	
History 123: Latin American History—Colonial Period	
History 124: South America since Independence	
History 126: Mexico and the Caribbean since Independence	
Political Science 177: Recent Trends in Latin American Politics and Government	
Political Science 178: International Politics in the Western Hemisphere	
At least one credit hour, as approved by the Adviser, from one of the foregoing groups	6
Total	36

MATHEMATICS

Mathematics 3: College Algebra	3
Mathematics 6: Plane Trigonometry	3
Mathematics 12: Analytic Geometry	3
Mathematics 19: Differential Calculus	3
Mathematics 20: Integral Calculus	3
Mathematics 123: Theory of Equations	3
Mathematics 125: Advanced Algebra	3
Mathematics 132: Differential Equations	3
Mathematics 136: Advanced Calculus	3
Statistics 52: Mathematics of Finance	3
Total	27

* Not required for the minor.

PHYSICS

Physics 5, 6, 7, and 8: General Physics.....	12
Physics 55: Physical Measurements.....	3
Physics 101: Mechanics.....	3
Physics 105: Principles of Electricity.....	3
Physics 117: Optics.....	3
*Chemistry Elective—Chemistry 11-12: General Chemistry or Chemistry 12-21: General Chemistry and Qualitative Inorganic Analysis.....	8 3 3
Mathematics 12: Analytic Geometry.....	3
Mathematics 19: Differential Calculus.....	3
Mathematics 20: Integral Calculus.....	3
*Six credit hours to be selected from the following:	
Physics 102: Heat and Thermodynamics.....	3
Physics 113: Atomic Physics.....	3
Physics 114: Statistical Physics.....	3
Physics 128: Sound.....	3
Physics 132: Electronics.....	3
Physics 155-56: Advanced Physical Measurements.....	3

Total.....

SOCIAL STUDIES

History 39-40: The Development of European Civilization.....	6
History 71-72: The Development of the Civilization of the United States.....	6
Political Science 9-10: Government of the United States.....	12
Two of the following courses.....	
Economics 1-2: Principles of Economics.....	3
Geography 51, 52: Introduction to Geography and World Regions Religion 59-60: History of Religion.....	3 3
Sociology 1-2: Introductory Sociology.....	3
*As liberal general studies courses, as approved by the Adviser, from one of the following fields: Economics, Geography, History, Political Science, Religion, Sociology.....	3

Total.....

SPANISH

Spanish 1-2: First-year Spanish.....	6
Spanish 3-4: Second-year Spanish.....	6
Spanish 9-10: Spanish Conversation and Composition.....	12
*Additional courses, as approved by the Adviser.....	3

Total.....

SPEECH

Speech 1: Effective Speaking.....	3
Speech 2: Persuasive Speaking.....	3
Speech 11: Training the Speaking Voice.....	3

* Not required for the minor.

Speech 32:	Oral Reading.....	3
Speech 104	Voice And Phonetics.....	3
Speech 154	Group Discussion and Conference Leadership.....	3
Speech 155	Play Production.....	3
Speech 175:	Speech Correction.....	3

*One of the following areas of specialization, as approved by the Adviser:

Group 1—Speech Arts	
Twelve credit hours to be chosen from the following.....	12

- Speech 102 Oral Interpretation of Literature
- Speech 126 Public Discussion and Debate
- Speech 154 Play Production
- Speech 166 History of the Theater
- Speech 169 Creative Dramatics and Children's Theater

Group 2—Speech Correction	
Twelve credit hours to be chosen from the following.....	12

- Speech 176 Speech Correction
- Speech 177-78 Clinical Practice in Speech Therapy
- Speech 182 Introduction to Hearing Problems
- Speech 183-84 Clinical Practice in Hearing Therapy

Additional courses in English, Physical Psychology, or Speech, as approved by the Adviser

Total.....	36
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PROFESSIONAL EDUCATION

The basic professional information and training in skills and attitudes needed by beginning teachers are provided through a sequence of courses to be taken in the junior and senior years. Lectures and class discussions are closely coordinated with field work. Instruction is differentiated to meet the needs of those preparing to teach on the various levels—elementary school, junior high school, senior high school, and adult.

Professional Courses—Secondary

Education 109-110	Learning and Teaching.....	6
Education 121-22	Society and the School.....	6
Education 131	Common Teaching Skills.....	3
Education 133-34	Observation and Student Teaching.....	12-12
Education 136 to 150	Special Methods.....	5-6
Total.....		24-27

Professional Courses—Elementary

Education 109-110	Learning and Teaching.....	6
Education 121-22	Society and the School.....	6
Education 111	Elementary School Curriculum.....	3
Education 133-34	Observation and Student Teaching.....	12-12
Total.....		24-27

*Not required for the minor.

Learning and Teaching.—Candidates enrolled in four-year programs leading to the degree of Bachelor of Arts take this course in the junior year. Those enrolled in five-year programs take it in the senior year.

The course attempts to promote a functional understanding of the nature of learning and teaching—characteristics of learning and principles of teaching are presented and discussed in the two one-hour class meetings each week. At least an equal amount of time is spent in observation and study of the application of these characteristics and principles to classroom situations. Class discussion normally revolves around these field experiences.

The course is also intended to provide the student with exploratory experiences of assistance to him in deciding whether to choose the profession of teaching. The student's performance in connection with the course is one of the factors considered when the Faculty reviews the list of candidates who have completed the first term of the junior year (senior year for those enrolled in five-year programs).

Society and the School.—This course is also taken in the junior year by candidates enrolled in four-year programs (senior year by those in five-year programs).

The first term of the course attempts to promote an understanding and appreciation of the role of schools in the sound promotion of the enduring interests of our democratic society. More particularly, it attempts to develop a functional understanding of the contributions of all social agencies in the education of people and of desirable cooperative working relations that help the school to play its part as a member of the institutional "team" of the community.

The second term of the course is concerned with study of the school as a whole—its purposes, program of studies, out-of-class activities, general organization, and major instructional problems. Although schools at all levels are studied, students give particular attention to schools at the level within which they are preparing to teach.

During both terms of this course classes meet for lecture and discussion two hours a week. At least an equal amount of time is spent in field study. During the first term each student studies cooperating social institutions. In the second term extended study of schools at the level of the student's special interest is supplemented by brief studies of schools at other levels. Class discussion is largely determined by field experiences.

This course is also intended to provide the student with exploratory experiences of guidance value. The performance of the student in the first term of the course is also given careful consideration by the Faculty in its review of the list of candidates at the beginning of the second term of the junior year (senior year for those enrolled in five-year programs).

Common Teaching Skills.—Those enrolled in four-year programs take this course in the senior year. Those enrolled in five-year programs take it in the fifth year.

The course is concerned with the skills needed by teachers in connection with classroom management, teaching techniques, homeroom procedures, administrative routines, activity sponsorship, group planning, and public relations.

Classes meet three hours a week for lecture, discussion, and laboratory. The observation of classroom teaching done in connection with the Observation Course (Education 133), for which students are normally enrolled concurrently, provides the field work of the course.

Special Methods Courses.—Associated with each teaching field is a course dealing with its special teaching problems. In addition to the study of practices followed by successful teachers, actual teaching content as found in current texts and courses of study is reviewed. Needed preparation, not included in academic courses available for teaching-field preparation, is taught in these courses.

Observation and Student Teaching.—This course is taken in the senior year by students enrolled in four-year programs (in the fifth year by those in five-year programs).

It begins with the observation of classroom teaching in selected situations. Assumption of responsibility for teaching functions is gradual, leading eventually to practice in the complete direction of classroom activities. Those preparing to teach in secondary schools have the opportunity of observing and doing practice teaching in both major and minor teaching fields on the senior high school level. The course is directed by full-time members of the faculty of the School of Education. The work of each student is under the direct supervision of a critic teacher, selected because of unusual success in teaching, ability to supervise, and broad understanding of educational problems. Critic teachers are part-time members of the instructional staff of the School. Observation and student teaching are done in the public schools of the metropolitan area of Washington, assuring practice in situations comparable to those the student is likely to face on becoming a teacher.

SPECIAL CURRICULA IN ELEMENTARY EDUCATION

Students preparing for elementary school teaching may also qualify as teachers of French, Spanish, remedial speech and remedial reading. Programs should be planned in conference with an adviser.

ADMISSION

To be admitted to candidacy for the degree of Bachelor of Arts in Education, the applicant must: (1) hold an Associate in Arts degree

based on the Education Curriculum in the Junior College or the equivalent from another accredited higher institution, or a certificate of graduation from an approved normal school or the equivalent; (2) have a quality-point index of 2.00 (average grade of C) counting "Incomplete" grades as "F"; (3) have demonstrated a genuine interest in teaching and possess personality traits that give promise of success as a teacher; and (4) have an interview in the Office of the School of Education.

FIVE-YEAR PROGRAMS LEADING TO THE DEGREES OF BACHELOR OF ARTS AND MASTER OF ARTS IN EDUCATION

Five-year programs are designed: (1) to permit more adequate teaching-field and professional preparation, (2) to prepare for special teaching positions, and (3) to meet teaching-certificate requirements based upon five years of preparation.

Students in these programs usually devote the junior year to additional teaching-field preparation and general education. Ordinarily, teaching field preparation is continued in the senior year and the first two professional courses (Education 109-10, 121-22) are taken. The work of the fifth year includes the remaining undergraduate professional courses and the balance of graduate courses needed to meet the requirements of the degree of Master of Arts.

Candidates must have a quality-point index of at least 2.50 before beginning the work of the senior year. As much as 18 credit hours of the work of the senior year may be taken for graduate credit. Observation and Student Teaching, taken in the fifth year, may not be taken for graduate credit.

Candidates enrolled in five-year programs are able to prepare more adequately in their major or minor teaching fields, or in both. Additional teaching field courses must be approved by the Adviser in the teaching field concerned.

The five-year plan of study also provides an opportunity for candidates to prepare to teach "common learnings" courses in one or more of the various core curriculum plans now being adopted in many secondary schools. Such programs need to be carefully planned to meet the demands of the situation in which the candidate hopes to teach.

A number of cities and some states require five years of satisfactory preparation before issuing certain teaching certificates. Candidates seeking such certificates should familiarize themselves with the requirements of the community or state concerned and plan their programs accordingly.

Five year programs must meet all the requirements of the degrees of Bachelor of Arts and Master of Arts in Education, and must be approved by the Adviser designated for these programs.

PROGRAMS LEADING TO THE DEGREE OF MASTER OF ARTS IN EDUCATION

Programs of study leading to the degree of Master of Arts are designed: (1) to enable teachers of experience to increase their knowledge of professional and academic information and skills, (2) to prepare for special types of educational service, and (3) to provide opportunities for graduates of liberal arts colleges to acquire needed professional education.

Programs are planned in conference with the designated Adviser and take into consideration the interests of the candidate, his previous background, and the certification requirements of the state and locality in which he plans to teach.

PLANS OF STUDY

Two general plans of study lead to the degree.

Plan 1.—This plan requires a minimum of 30 hours of graduate credit, including a thesis carrying 6 hours of graduate credit.

Plan 2.—This plan requires a minimum of 33 hours of graduate credit, including a course in *Educational Research Methods and Procedures* carrying 3 hours of graduate credit.

Graduate work completed in other accredited institutions of learning may be credited toward the Master's degree, but a minimum of 30 credit hours must be completed in the School of Education of The George Washington University. Not more than nine credit hours of the minimum thirty hour requirement may be taken in off campus courses.

Advanced courses completed in excess of the requirements for the Bachelor's degree in this University may be credited toward the Master's degree to the extent of 12 credit hours, provided the work fits in with the student's plan of specialization and is approved in writing by the Dean before being undertaken.

In determining advanced standing at the time of admission or re-admission to Master's candidacy at this University, graduate work completed more than three years previously is not counted.

Under Plan 1, a minimum of 12 credit hours, in addition to the thesis, must be from courses planned primarily for graduate students (third-group courses). Under Plan 2, a minimum of 18 credit hours, in addition to the course in *Educational Research Methods and Procedures*, must be from third group courses. Under either plan a minimum of 12 credit hours, not including the thesis or the research course, must be from courses offered in the Department of Education.

Programs may provide for additional academic preparation in one or more teaching fields. In such cases, however, undergraduate and graduate courses combined must be at least equivalent to the under-

graduate requirements for the degree of Bachelor of Arts in Education in the teaching field concerned.

Programs are normally based upon undergraduate preparation equivalent to the requirements of the degree of Bachelor of Arts in Education (see pages 12-13). Candidates with less professional preparation must make up their deficiencies either prerequisite to or as part of their graduate study.

Each candidate must file in the Office of the Dean not later than one month after admission to the School of Education a program of study approved by his Adviser.

COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a professional comprehensive examination in two parts: (1) a general examination concerned with an integrated understanding of the major areas in professional education, and (2) a special examination concerned with the candidate's area of specialization.

The general part of the comprehensive examination is divided into three groups as follows: Group I (Foundations) covers learning and teaching, society and the school, child growth and development, history of education, philosophy of education, and educational research; Group II (Major Levels) covers elementary education, secondary education, adult education, employee training, vocational education, and physical education; Group III (Common Elements) covers administration, curriculum, evaluation, guidance, methodology, and reading.

The candidate must be prepared to answer two questions in each group, none of which shall include his area of specialization.

PROGRAMS OF STUDY

Secondary Education—Senior or Junior High School

Students interested in secondary school teaching whose undergraduate degrees are in professional education are encouraged to strengthen their teaching field preparation by including in their programs of study content courses.

Programs include, in addition to teaching field courses six credit hours in Secondary Education, and an additional twelve credit hours or work chosen from the following professional courses: Education, Curriculum, Extra-classroom Activities, Guidance in Secondary Schools, Philosophy of Education, History of Education, and Evaluation.

School Administration—Secondary School Principalship or Elementary School Principalship

Programs of those interested in the position of principal customarily

include The Teacher and School Administration, The Teacher and School Supervision, and either Secondary School Management or Administration of Elementary Education. Additional courses are chosen as needed from Adult Education, Curriculum, Elementary Education, Guidance, Public Relations, School Finance, School Law, School Plant Planning, and Secondary Education.

Adult Education

Programs of those particularly interested in the education of adults may or may not include additional teaching-field preparation. In addition to six credit hours of work in Adult Education professional courses may be chosen from Audio-visual Education, Curriculum, Employee Training, Evaluation, Guidance, History of Education, Mental Hygiene, and Philosophy of Education.

Elementary Education—Intermediate Grade or Early Childhood Education

Programs customarily include either Elementary Education or Early Childhood Education with additional courses chosen from Child Growth and Development, Children's Literature, Curriculum, Evaluation, History of Education, Mental Hygiene, Philosophy of Education, Reading Problems, and Speech Correction.

Agricultural Extension Education

These programs are designed for those with successful experience in agricultural extension education. Six or more credit hours of work are devoted to agricultural extension education, by special arrangement with the Extension Service of the United States Department of Agriculture. The remainder of the program is planned in accordance with the interests and needs of the candidate and usually includes courses in Supervision, Adult Education, and Secondary Education. Courses in Administration, Curriculum, Evaluation, Group Leadership, Guidance, Personnel Psychology, Research, Speech, and Statistics may also be chosen.

Curriculum

Programs of those interested in specializing in curriculum development include six credit hours of work in Curriculum with additional courses chosen from Adult Education, Audio-visual Education, Child Growth and Development, Course of Study Construction, Elementary Education, Evaluation, Extra-classroom Activities, and Secondary Education.

Employee Training

Programs for those interested in the training of employees in business, industry, and government normally include courses in Employee Training and Adult Education. Additional courses are chosen from Audio-visual Education, Curriculum, Guidance, Mental Hygiene, Personnel Psychology, Philosophy of Education, Public Relations, and Techniques of Counseling.

Guidance

Programs for those especially interested in guidance usually include courses in Educational and Vocational Guidance, Techniques of Counseling, Guidance in Secondary Schools, and Occupational and Educational Information. Additional Courses frequently chosen include Adult Education, Curriculum, Employee Training, Evaluation, Individual Psychological Testing, Personnel Psychology, Philosophy of Education, Psychological Tests, Secondary Education, and Test Construction.

ADMISSION

To be admitted to candidacy for the degree of Master of Arts in Education the applicant must: (1) hold a Bachelor's degree from an accredited institution; (2) have an undergraduate quality point index of 2.50 or above (C + average); (3) have demonstrated a genuine interest in teaching; (4) be in possession of personality traits that give promise of better-than-average success as a teacher.

To be admitted to candidacy in programs designed to prepare for service in guidance and administration two years of successful teaching experience are prerequisite. Candidates who have had no professional courses must satisfactorily complete the required undergraduate professional courses, including Observation and Student Teaching, in addition to graduate course requirements.

THE ADVANCED PROFESSIONAL CERTIFICATE

Upon the satisfactory completion of the program of advanced graduate studies of the School of Education, the Advanced Professional Certificate is granted. This program is designed to prepare teachers and administrators for more effective service in their chosen fields and to enable them to qualify for a higher step in the local salary scale.

The program of studies leading to the certificate is selected by the candidate and his adviser from the various related departments of the University in accordance with his needs. In general it includes thirty hours of graduate credit beyond the Master's degree. The candidate wishing to increase his teaching proficiency may include additional study in his teaching field.

ADMISSION TO CANDIDACY

A Bachelor of Arts degree in Education or Bachelor of Science degree in Physical Education from the School of Education, or the equivalent from another institution of higher learning; a Master's degree, from an accredited institution, at least two years of successful teaching experience, and a permanent teaching or administrative license are required. The applicant who is unable to meet the admission requirements may be admitted with deficiencies to be met by satisfactorily completing prerequisites in addition to the specified program of graduate study. Each applicant must be interviewed by a member of the Faculty of the School of Education. The applicant seeking to qualify for a higher level in the local salary scale must have his program approved by the appropriate representative of the school system employing him.

TRANSFER OF CREDIT

Appropriate graduate work completed in other accredited higher institutions may be credited toward the requirements for the Certificate, but a minimum of eighteen credit hours must be completed at The George Washington University as a matriculated candidate in the School of Education. The candidate is encouraged to include in his program study at other accredited higher institutions when such study seems to be in his best interest. In determining advanced standing at the time of admission or readmission to Certificate candidacy, graduate work completed more than three years previously is not counted.

REQUIREMENTS FOR THE CERTIFICATE

Plans of Study

In planning his program of studies the candidate should give first consideration to his particular needs. If he is a teacher and his graduate study leading to the Master's degree was largely in professional education, he may find it desirable to emphasize additional mastery of his teaching field. If his Master's preparation was in a content field, he may wish to devote a major part of his program to additional professional study. Those in administration and related services may wish to continue specialization on a more advanced level.

The program of study must include, in addition to any prerequisites, a minimum of thirty hours of graduate credit in third-group courses and not less than twelve credit hours in courses offered by the School of Education.

RESIDENCE

Candidates for the Advanced Professional Certificate must complete satisfactorily at this University a minimum of eighteen credit hours in courses offered on the campus. The balance of the program may be in the College of General Studies off-campus courses or in other approved institutions of higher learning. The candidate is not required to pursue his program of study continuously. On request, a leave of absence is granted to the candidate for a period not to exceed three years.

PROGRAM LEADING TO THE DEGREE OF DOCTOR OF EDUCATION

The requirements for the degree of Doctor of Education cannot be stated in credit hours, but they consist in general of at least two full years of work beyond the degree of Master of Arts in Education or the equivalent. The programs of study are designed to prepare students for administrative or supervisory positions, the teaching of education in normal schools or colleges, the teaching of an academic subject in schools or colleges, or for specialized types of educational service. The work is given a practical rather than a theoretical bent, and emphasizes the mastery and application of subject matter, both in the study requirements and in the dissertation. Special emphasis is placed upon the professional success of the candidate.

The candidate's program of study depends for the most part upon his previous educational background and his professional objective. Opportunities are provided for study leading to the following professional objectives:

School Superintendent
Secondary School Principal
Elementary School Principal
Superintendent

Director of Guidance
Director of Curriculum Development
Professor of Education
Specialist in Educational Research

QUALIFICATIONS OF THE APPLICANT

The candidate for the degree of Doctor of Education must have completed (1) graduate work in fields prerequisite to his objective, equivalent to that required for the degree of Master of Arts in Education in The George Washington University, and (2) at least three years of successful educational experience.

ADMISSION TO CANDIDACY

To be admitted to candidacy for the degree the applicant must be accepted by the Faculty of the School of Education on the basis of an examination conducted by a committee appointed by the Dean. This

examination will usually include the following: (1) a written examination involving problems related to the applicant's background; (2) a scholastic-aptitude test; (3) an oral examination.

CONSULTATIVE COMMITTEE

If the applicant is accepted as a candidate, his consultative committee, in cooperation with the candidate, will (1) determine the candidate's field of study, in each of which the candidate must pass a written examination at least eight months before he presents himself for the degree; (2) formulate a list of course requirements and of readings that will assist him in preparing for these examinations; and (3) designate the tools of investigation that will be needed by the candidate in the prosecution of his study. These tools may include one foreign language, or more, statistical methods, historical criticism, or any others considered essential by the committee. An examination in the tools designated must be passed by the candidate before he takes his comprehensive examination.

THE DISSERTATION

When the candidate has satisfied the requirements of his consultative committee, the committee is dissolved. A member of the faculty, in whose field the topic of the dissertation falls, is then appointed to serve as the candidate's adviser on his dissertation and in his field of specialization, and to recommend him to the Dean for the final oral examination when, in his judgment, the candidate's dissertation is acceptable.

Not later than the date specified in the University calendar the candidate shall submit to the Dean of the School of Education three copies of his dissertation—one typewritten original and two legible and complete carbon copies, on official thesis paper—and also a typewritten summary of the dissertation consisting of not more than 2,500 words. Requirements regarding the form of the dissertation are stated in the general catalogue and additional information will be supplied by the Dean.

The successful candidate is required, before receiving his degree, to pay a fee to cover the expense of printing the summary of his dissertation.

THE FINAL EXAMINATION

At least three weeks before the degree is to be conferred the candidate must pass an oral examination on his dissertation and on his field of specialization before a committee of the Faculty appointed by the Dean, supplemented by two experts from outside the University appointed by the President. This examination is open to the public and

all are privileged to question the candidate. The Dean, or a member of the Faculty designated by him, will preside at this examination.

READING CLINIC

To help children and adults with reading difficulties the University operates a diagnostic and corrective reading clinic. Children may be referred by principals, teachers, or parents. Adults may apply by telephone.

To arrange for a clinical examination of reading status, address The George Washington University Reading Clinic, 802 Twenty-first Street, N.W., or telephone STerling 3-0250, Extension 491, for an appointment. The Clinic is open for appointments Monday through Friday, from 9:00 A.M. to 5:00 P.M.

A complete diagnostic examination usually requires the greater part of a day. When completed, a written report is given and a conference arranged at which disabilities are discussed in detail and suggestions for corrective work are outlined. The fee is \$25.

SPECIAL CURRICULA

The School of Education provides special curricula for Liberal Arts Graduates, housewives, and retired military personnel who wish to prepare for teaching. It also provides a wide range of courses of interest to (1) emergency teachers who wish to qualify for teaching certificates, and (2) teachers who wish to renew licenses. Leaflets describing these curricula may be obtained on request.

REGULATIONS

Students in the School of Education are subject to, and are expected to familiarize themselves with, the general University regulations stated in the University catalogue.

REGISTRATION

Before a student may be admitted to registration he must have satisfied the Office of the Director of Admissions that he is qualified to enter the University.

A student who has previously matriculated in the University, but who has not been in attendance during the term prior to registration, should file an application for readmission in advance of registration.

Registration is for the term unless otherwise indicated on the registration paper. No registration is accepted for less than a term or one summer session.

A student may not register concurrently in The George Washington University and another institution without the permission of the Dean. Allowance of credit for work done concurrently will be at the discretion of the Committee on Admission and Advanced Standing.

AMOUNT OF WORK

A normal program of work for an undergraduate student is fifteen credit hours. A student with a quality-point index of 3.00 or higher may, with the Dean's permission, take eighteen hours. More than eighteen hours may not be taken except by special permission of the Committee on Scholarship.

For an employed student six or seven credit hours constitute a normal program. A student with a quality-point index of 3.00 or higher for the preceding term may be permitted by the Dean to take nine or ten credit hours.

For a graduate student fifteen or sixteen credit hours constitute a normal program. For an employed student six or seven credit hours constitute a normal program. If scholarship is sufficiently high, or the nature of employment unusual, the Dean may permit registration for additional credit hours.

A student carrying a full-time program may not be employed part-time for more than fifteen hours a week without permission of the Dean.

ATTENDANCE

A student is not permitted to attend classes until registration has been completed and fees due have been paid. Regular attendance is required. A student may be dropped from any course for undue absence.

SUSPENSION

An undergraduate student who fails to pass in half or more than half of his work, based on a minimum of sixteen credit hours, will be suspended.

A student who has been suspended, either for delinquency in payment of fees or for any other reason, is not permitted to attend classes during the period of suspension.

A student who has been suspended for poor scholarship may within ten days appeal his case to the Committee on Scholarship through the Dean. If the case appears to be remediable and the student appears likely to improve in his scholarship thereafter, the Committee may readmit him on probation. A student who has been denied readmission on probation may petition the Committee on Scholarship through the Dean for readmission after the lapse of a calendar year. A student who has been suspended twice will not be readmitted.

WITHDRAWAL

Withdrawal from a course or from the University, *without academic or financial penalty*, requires the permission of the Dean. *Permission to withdraw from the University will not be granted a student who has not a clear financial record.*

Withdrawal between October 31 and the end of the fall term and between February 29 and the end of the spring term is permitted only in exceptional cases.

All charges for courses dropped without the approval of the Dean must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

CHANGES IN PROGRAM OF STUDIES

Changes within the School.—A student may not change or drop courses (see "Withdrawals", above) or change his status to that of auditor except with the approval of the Dean, upon presentation of adequate reasons for such changes.

Change from one section to another of the same course may be made with the approval of the Dean and the department concerned.

Change from one major subject to another within the same college or school may be made with the approval of the Dean. All requirements specified in the course of study to which the change is made must be satisfied before graduation.

Transfers within the University.—Transfer from one college, school or division to another may be made only with the approval of the deans concerned. Application for transfer must be made to the Director of Admissions on the proper form provided by his office.

In order to provide degree candidates with proper academic counsel and the benefits of integrated programs of study, the faculties of the various schools and colleges have established minimum residence requirements and regulations with regard to supervision of the work done in the student's major field. In addition, various special regulations regarding course sequence, selection of electives, and advisory approval of programs apply in particular curricula. Students transferring within the University are advised to study carefully the graduation requirements and to note that in all undergraduate divisions 30 credit hours, including *at least 12 credit hours* in the major field must be completed *in residence* in the school or college from which the degree is sought. Upon transfer the student should consult the dean concerned and understand clearly all the requirements he must fulfill.

SUMMER SCHOOL CREDIT

A student who plans to attend summer school sessions at another institution with the intention of having credits so obtained apply toward graduation from this University must first secure the written approval of the Dean. In no event will such credits be recognized to an amount in excess of that which might be earned in a similar period in this institution.

GRADUATION REQUIREMENTS

To be recommended for graduation a student must have met the admission requirements of the college or school in which he is registered, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered, and be free from all indebtedness to the University.

Application for Graduation.—Application for a degree should be filed in the Office of the Registrar at the time of registration for the last term of the senior or final year.

Scholarship.—The undergraduate student must maintain a quality-point index of at least 2.00.

The graduate student must maintain a quality-point index of 3.00.

Residence.—A minimum of one year, or thirty credit hours, including at least twelve credit hours in the major field, must be completed in residence. Not more than nine credit hours of the residence requirement may be satisfied by off-campus courses. Summer term work may be counted in residence, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in residence.

The graduate student must meet the residence requirements for the particular degree for which he is registered.

With the permission of the Dean a student may be granted leave of absence; such student should, however, remain technically in residence by paying the residence fee for each term he is absent. For the purpose of this regulation, the summer sessions will not be considered a term.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

Presence at Graduation.—A candidate is required to be present at the graduation exercises unless written application for graduation in absentia is approved by the Dean.

THE LIBRARY

A student registered in the University is entitled to the reference use of the University Library. The Student Identification Card, issued upon the payment of fees, must be presented as identification.

Library books, with the exception of those in the Law and Medical collections, may be drawn for home use for a period of two weeks. Any book which does circulate is subject to recall by the Librarian at any time. Reserve books and periodicals for collateral reading must be used in the reading rooms when the Library is open. With special permission they may be drawn for overnight use when the Library closes. A fine of twenty-five cents will be charged for the first hour or fraction of an hour and five cents for each hour or fraction thereafter that a reserve book is overdue. Grades of a student will be withheld until his library record is clear.

HOURS

The University Library is open from 9:00 A.M. to 10:00 P.M. each class day (Saturday 9:00 A.M. to 5:00 P.M.), and from 2:00 to 6:00 P.M. on Sunday.

FEES AND FINANCIAL REGULATIONS

By authorization of the Board of Trustees, the following fees have been adopted:

Tuition Fees

For each credit hour for which the student registers (except work taken by a candidate for a Doctor's degree)	\$10.00
For the degree of Doctor of Education	\$8.00
For work* leading to and including the general examination	\$8.00
For work leading to and including the final examination	\$8.00

* This fee does not cover the cost of tuition for elementary courses (numbered 1-100).

ADDITIONAL COURSE FEES

In certain courses additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions. These fees are charged by the term and, unless otherwise indicated, may be defrayed in three payments when the tuition is paid in this manner. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee the individual student will be required to pay such additional charges as are determined by the department concerned.

GRADUATION FEES

When a degree is conferred	2.00
When an Advanced Professional Certificate is conferred	2.00
Fee for Binding MASTER'S THESIS	5.00
Fee for Printing SUMMARY OF DOCTORAL DISSERTATION	75.00

SPECIAL FEES

Application fee, charged each applicant for admission, non-refundable	3.00
Late-registration fee, charged each student who fails to register within the designated period	5.00
Withdrawal fee, charged each student who preregisters and withdraws prior to the regular registration	5.00
Service fee, charged each student for late payment of tuition (see "Payment of Fees")	1.00
Reinstatement fee, charged each student who is reinstated after suspension for delinquency in fees	5.00
Residence fee, charged each student willing to maintain "in residence" status during any term of absence from the University or its campus	10.00
For special physical examination	2.00
For each examination to qualify for advanced standing and for each special examination	5.00
Laboratory check-out fee, charged each student in chemistry courses who fails to check out of the laboratory by the time set by the instructor	2.00
Transfer fee, charged for each transcript of record after the first	1.00

Registration in the University entitles each student to the following University privileges: (1) the issuance of one certified transcript of record, it and when desired; (2) the services of the Placement Office; (3) the use of University library facilities, except as otherwise designated; (4) gymnasium privileges; (5) admission to all athletic contests, unless otherwise specified; (6) subscription to the *University Hatchet*, the student newspaper; (7) admission to University debates; (8) medical attention and hospital services as described in the General Catalogue. These privileges, with the exception of the issuance of transcripts, terminate, and a student is no longer in residence, when he withdraws or is dismissed from the University.

PAYMENT OF FEES

All fees are payable at the Office of the Cashier, 725 Twenty-first Street NW. No student is permitted to complete registration or to

attend classes until all fees are paid. Fees for each term are due and payable in advance at the time of registration.

In exceptional cases, subject to the approval of the Treasurer, the student may sign a contract for term charges, except for fees payable in advance, permitting payments as follows:

Fall Term.—One third at the time of registration; one third on November 3; one third on December 3.

Spring Term.—One third at the time of registration; one third on March 3; one third on April 3.

A student who fails to meet payments when due, but who pays his fees on or before the fifteenth of the month in which payment is due, is charged a service fee of \$1. A student who fails to meet payments by the fifteenth of the month in which payment is due will be automatically suspended and may not attend classes until he has been officially reinstated and has paid all accrued fees and a reinstatement fee of \$5.

A student suspended for failure to meet payments when due may not be reinstated for the term after two weeks from the date of suspension. Applications for reinstatement are to be made to the Office of the Cashier.

An auditor pays all fees chargeable to the student registered for credit except the late-registration fee.

WITHDRAWALS AND REFUNDS

Application for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Notification to an instructor is not an acceptable notice.

In authorized withdrawals and changes in schedules, financial adjustments will be made as follows:

Fall Term.—Withdrawal dated on or before October 31, cancellation of two-thirds of tuition charges; withdrawal dated on or before November 30, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to November 30.

Spring Term.—Withdrawal dated on or before February 29, cancellation of two-thirds of tuition charges; withdrawal dated on or before March 31, cancellation of one-third of tuition charges. No refund or reduction will be allowed on a withdrawal dated subsequent to March 31.

In no case will a refund be made of the first third of the total tuition charges unless the registration is in advance and is cancelled before the regular registration day. In this case a withdrawal fee of \$5 is charged and tuition fees refunded. In no case will tuition be reduced or refunded because of nonattendance upon classes.

Payment applies only to the term for which a registration charge is incurred and in no case will this payment be credited to another term.

Any student in chemistry who fails to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a checkout fee in the amount of \$2. A student who drops a course before the end of the term must check out of the laboratory at the next regular laboratory period.

Any student enrolled in the Air Force ROTC who fails to turn in uniforms, equipment, and textbooks, on separation from the Corps, will be charged the value of the missing items.

Authorization to withdraw and certification for work done will not be given a student who has not a clear financial record.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" Office is maintained in the Student Union.

COURSES OF INSTRUCTION

The University reserves the right to withdraw any course announced.

EXPLANATION OF COURSE NUMBERS

An odd number preceding the name of the course indicates that the course is offered in the fall term; and an even number, that it is offered in the spring term. The letter "x" following an odd course number (e.g., 295x) indicates that the course, normally offered in the fall term, is given in the spring term. The letter "x" following an even course number indicates that the course, normally offered in the spring term, is given in the fall term.

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the Adviser and the Dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be credited toward a higher degree.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be credited toward higher degrees only when registration for graduate credit has been approved at the beginning of the course by the Dean of the School of Education and by the officer of instruction concerned, and when the completion of additional work has been certified by the officer of instruction.

Third-group courses.—Courses numbered from 201 to 300 are planned primarily for graduate students. They are open, with the approval of the officer of instruction, to qualified seniors.

INDICATION OF THE AMOUNT OF CREDIT

The number of credit hours given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a year course giving three hours of credit each term is marked (3-3), and a term course giving three hours of credit is marked (3).

DEPARTMENT OF EDUCATION

Courses offered by the Department of Education are of two types: those designed for the preservice education of candidates and those planned for the inservice education of teachers.

Preservice courses devote two fifty-minute periods a week to lecture and discussion supplemented by a minimum of two hours a week of related field work. A clinical approach to the study of educational

problems is used—lectures and discussions revolving around observed practices.

Inservice courses usually meet only once a week for a two-hour period. Class work is supplemented by extensive reading assignments, the preparation of reports, and field work. A student enrolled in one of these courses should plan to devote not less than seven hours a week, exclusive of class time, to the work of the course.

Ample opportunity is provided to study teaching or administrative problems of special interest. To enable students to consult with instructors regarding individual problems, a conference hour is scheduled immediately before or after the class period.

Only the courses designed to provide professional information and skills are listed below. For courses needed for general education or teaching-field preparation, see the general catalogue. In addition to courses offered in the Department of Education a number of professional courses for teachers are offered in the departments of Psychology, Speech, and Statistics. These are listed below together with courses offered by the Department of Education.

Whenever possible, the exact hour of class meeting is stated. Hours for classes not yet scheduled may be found in the Schedule of Classes for the term concerned.

FIRST GROUP

Education A Reading (1 hour) Coleman and Staff
Diagnosis of reading difficulties, individual or group lessons without academic credit. Fee for diagnosis, \$2.50; for individual lesson, \$3.50; for group lesson, \$2.50; materials fee, \$1.

Psychology 22 Introduction to Educational Psychology (3) Faith, Lindley
Consideration of individual and group differences, adjustments, and the psychology of learning in relation to curriculum and teaching. Morning.
Psychology 22X, same as 22, offered fall term. Tues. and Thurs., 6-8
7-25 P.M.

Psychology 20 Child Psychology (3) E. Johnson
A general approach to the study of the child. Special emphasis is placed on the psychological problems, behavior, and the child's view of the world. Morning.
Psychology 20X, same as 20, offered spring term. Morning.

Statistics 53 Introduction to Statistics in Psychology and Education (3) The Staff
Methods of data tabulation, charts and graphs, averages, dispersion, quartiles, normal distribution, raw scores and derived scores, correlation, reliability and validity of tests, normal curve, confidence intervals, elementary sampling, statistical error, interpretation of statistics. Prerequisite: some experience with algebra. Includes

any fee, \$8. Lecture—section A, Tues. and Thurs., 10:10 A.M. section B, Mon. and Wed., 7:35 to 8:25 P.M.; laboratory—section M, Thurs., 2:10 to 3:50 P.M.; section N, Tues., 4:10 to 5:50 P.M.; section P, Mon., 8:10 to 10:10 P.M.; section Q, Wed., 8:30 to 10:10 P.M.
Statistics 53X, same as 53, offered spring term. Evening.

SECOND GROUP

Statistics 105X *Statistics in Psychology and Education*. The St. B.

(3)

Advanced study of correlation and frequency analysis; sampling theory; factor analysis, and applications to specific problems utilizing case method of study in as far as possible. Original work is required of each student. Prerequisite: Statistics 53. Laboratory fee, \$8. Morning.

Education 109-10 *Learning and Teaching* (3-3)

For the general student as well as the prospective teacher. Fall term, nature of learning approached through the study of actual classroom situations. Spring term, nature of teaching approached through observation of typical classroom situations. Sections A, Mon., 1:10 to 2:00 P.M.; field work to be arranged; section B, Wed., 2:10 to 3:00 P.M.; field work to be arranged. Education 113X, same as 113, offered fall term. Fee, 1:10 to 2:00 P.M.

Education 111 *Elementary School Curriculum* (6)

For study in the elementary school curriculum. An integrated method of study dealing with the various experiences—designed to meet the developmental needs of children in the natural and social sciences, the language arts, and concepts of number. Also includes the study of general curriculum problems and the evaluation of pupil progress. To be taken concurrently with Education 113. Prerequisite: Education 109-10 and 121-22. Mon. and Wed., 2:00 A.M. to 4:30 P.M., beginning 113.

Education 113 *Elementary School Art* (3)

For teachers in the elementary school curriculum. Materials and methods. Prerequisite: Psychology 1 and 2. Materials fee, \$1.50. Lecture and laboratory, Thurs., 5:30 to 9:00 P.M.; field work to be arranged. Newlin

Education 114 *Elementary School Music* (3)

For teachers in the elementary school curriculum. Materials and methods. Prerequisite: Psychology 1 and 2. Thurs., 7:35 to 9:35 P.M. Reed

Education 115 *Elementary School Reading* (3)

For teachers. Methods of teaching beginners and the development of reading skills. Prerequisite: Education 109-10 and 121-22 or teaching experience. Lecture—Fri., 7:30 to 9:00 P.M.; field work (2 hours)—to be arranged. St. Cyr, Welshans

Education 116 *Elementary School Social Studies* (3)

For teachers. Content and methods of teaching. Prerequisite: Education 109-10 and 121-22 or teaching experience. Lecture—Fri., 7:30 to 9:30 P.M.; field work (2 hours)—to be arranged. Also offered 1955 summer term in experienced teachers. Welshans

Education 117 *Elementary School Science* (3) St. Cyr
For teachers. Materials and methods. Prerequisite: Education 109-110 and 121-22 or teaching experience. Lecture—Sat., 9:42 to 12:00 A.M.; field work (2 hours)—to be arranged.

Education 120 *Elementary School Arithmetic* (3) St. Cyr
For teachers. Contents, materials and methods. Prerequisite: Education 109-110 and 121-22 or teaching experience. Lecture—Mon., 7:15 to 9:15 P.M.; field work (2 hours)—to be arranged.

Education 121-22 *Society and the School* (3-3) St. Cyr
For the general student as well as the prospective teacher. Fall term: the social, national, and international scope of education; cooperation of the school with other community agencies. Spring term: organization and operation of schools; principles and functions. Section A: Wed., 7:15 to 9:00 P.M.; field work to be arranged. Section B: Mon., 6:15 to 8:00 P.M.; field work to be arranged.

Education 122X, same as 122, offered fall term. Thurs., 1:40 to 3:00 P.M.

Psychology 121 *Educational Psychology* (3) Faith
Advanced course in educational psychology. Open each term on the individual study plan to a limited number of students. Time to be arranged.

Education 125 *Children's Literature* (3) Walker
For interest in the elementary school curriculum. Exploring and evaluating the better books for children and the children's classics; understanding the development of literature as a social development; appreciating children's original expressions. Prerequisite: Psychology 1 and 29. Tues., 7:35 to 9:35 P.M.; field work (2 hours)—to be arranged.

Psychology 129 *Introduction to Counseling and Guidance* (3) Dreese
A survey of the basic principles, techniques, and procedures as applied to vocational, educational, and personal counseling. Thurs., 6:15 to 8:50 P.M.

Education 131 *Common Teaching Skills* (3) Root
For interest in the secondary school curriculum. Course, unit, and lesson plans; practical techniques used in connection with motivation, the student, class, group, procedure, classifying study, individual differences, evaluation, social studies, discipline, the classroom, activity sponsorship, public relations. Prerequisite: Education 109-110 and 121-22. Tues. and Thurs., 12:00 to 1:45 P.M.
Education 131X, same as 131, offered spring term. Mon. and Fri., 4:30 to 6:45 P.M.

Psychology 131 *Psychological Tests* (3) Hunt
A survey of psychological tests and their more common uses in business, industry, education, law, medicine and education. Manual for St. Louis. Tues., 11:15 A.M. to 12:45 P.M.
Education 131X, same as 131, offered spring term. Evening.

Root, LaBue

†Education 133-34 *Observation and Student Teaching* (3-3 to 6)

For seniors in the elementary or secondary school curriculum. Education 133, student-teaching fee, \$15. Admission by permission of the instructor.
Prerequisite: Education 129-130 and 121-22. Time to be arranged individually.

Psychology 141 *Leadership, Group Behavior, and Student Life* (3)

A survey of the foundations of leadership, of the factors which underlie effective participation in group activities, and of the interrelations between the student and his university. Mon., Wed., and Fri., 11:10 A.M.

Psychology 144 *Personnel Psychology* (3)

The application of psychology to personnel work in education, business, industry, and government. Meaning.
Prerequisite: Psychology 144X, same as 144, offered fall term. Tues. and Thurs., 7:35 to 8:50 P.M.

Hubbard, Mosell

SPECIAL METHODS COURSES*

To be elected in the senior year after substantial preparation in the teaching fields concerned, by students in the secondary school curriculum. Course requirements and hours of credit vary with license requirements. Practices of successful teachers are studied and actual teaching content as found in current texts and courses of study is reviewed.

Education 136 *Teaching English* (2 to 4)

Prerequisite: Eighteen credit hours of English. Mon., 7:10 to 9:10 P.M.
field work (2 hours) to be arranged.

Education 138 *Teaching Social Studies* (2 to 4)

Prerequisite: Twenty-four credit hours of social studies. Thurs., 7:35 to 9:35 P.M.; field work (2 hours) to be arranged.

Education 140 *Teaching Mathematics* (3)

Prerequisite: Mathematics through calculus. Tues., 5:10 to 7:00 P.M.

Education 144 *Teaching Science* (2 to 4)

Prerequisite: Twenty-four to forty credit hours of science. Thurs., 5:10 to 7:00 P.M.; field work (2 hours) to be arranged.

Education 146 *Teaching Foreign Languages* (2 to 4)

Prerequisite: Eighteen credit hours of one foreign language. Tues., 5:10 to 7:00 P.M.

Education 148 *Teaching Home Economics* (2)

Prerequisite: Thirty credit hours of Home Economics. Time to be arranged.

Education 150 *Teaching Business Subjects* (2)

Prerequisite: Thirty credit hours of business education. Time to be arranged.

* Prerequisite to all special methods courses: Education 100-101, 121-22, and 131. Additional prerequisites are stated under each course.
* A degree program in which students are required to take the first half of a course must be completed before credit is allowed.

Psychology 171x *Psychology of Personality* (3) Caldwell
Contemporary approaches to the study of personality. Prerequisite: 12 credits in psychology, including Abnormal Psychology. Morning.

Speech 175-76 *Speech Correction* (3-3) Pettit
A study of the causes of the disorders of speech with emphasis on methods in diagnosis and treatment of defective speech. Admission by permission of the instructor. Laboratory fee, \$6 a term. Speech 175 Tues. and Thurs., 7:35 to 8:50 P.M.

THIRD GROUP*

Education 205-6 *The Curriculum*† (3) Bish
For experienced teachers. Fall term: curriculum foundations and issues; comparing of curriculum patterns. Spring term: principles and procedures in curriculum development, group consideration of student problems. Sat., 11:15 A.M. to 1:00 P.M.

Education 207 *Curriculum Materials*† (3) Bish
For experienced teachers. The study and construction of courses of study, resource units, classroom teaching aids, and inexpensive materials; direct application to student's own situation. (Not offered in 1955-56.)

Education 209-10 *Child Growth and Development*† La Bue
(3-3)
Basic factors in human growth and development and their relation to learning and teaching. Related practical experience in studying children; class analyses of procedures and results. Fri., 7:10 to 9:10 P.M.

Education 212 *Evaluation in Education*† (3) Ruffner
Concept of evaluation, relationship between evaluation of ends and means, steps involved in the evaluation of learning experiences. As the course progresses each student develops solutions for the evaluation problems related to work situation. (Not offered in 1955-56.)

Education 213-14 *History of Education* (3-3) Jarman
Fall term: the European background of American education. Spring term: the evolution of the American school system. Tues., 7:35 to 9:35 P.M.

Education 215 *Education of the Exceptional*† (3) La Bue
For classroom teachers. A survey of current problems in the education and guidance of exceptional pupils. Nature and needs of those physically, mentally, or emotionally handicapped, needs of the gifted. Resources for help in instruction, diagnosis, therapy, education, and guidance. (Not offered in 1955-56.)

Education 216 *Education of the Slow Learner*† (3) La Bue
Instruction, practice, and study in the slow learner at the elementary and high school levels. Hands-on term curriculum development designed for classroom teachers who must provide special methods and materials in the education and guidance of the slow learner. Area of interest to classroom teachers and administrators. (Not offered in 1955-56.)

*A three-term educational program is prerequisite to all third-group courses.
†Instructional experience is prerequisite to all third-group courses.

Education 217-18 *Contemporary Problems in*

Jarman

*Education** (3-3)

Fall term: designed to help students formulate a personal philosophy of education. Spring term: social foundations of education—a study of the forces that shape the policies and offerings of the school. Mon., 7:10 to 9:15 P.M.

Education 219 *Recent Developments in Elementary*

La Bae

*Education** (3)

For experienced teachers. New areas of emphasis, changing techniques of working with children, curriculum trends, review of recent literature. (Not offered in 1955-56.)

Education 220 *Intermediate Grade Education** (3)

A study of the curriculum and methods of teaching in the intermediate grades, based upon a growing understanding of the child and his environment. (Not offered in 1955-56.)

Education 221-22 *Early Childhood Education** (3-3)

For experienced teachers. Fall term: nursery school and kindergarten education. Spring term: education in the primary grades. (Not offered in 1955-56.)

Education 223-24 *Reading Problems** (3-3)

Coleman

For experienced teachers. A clinical approach to reading difficulties on elementary and secondary school levels. Demonstrations and observations, with class cases. Wed., 7:10 to 9:15 P.M.

Psychology 223 *Seminar: Learning* (3)

B. H. Fox

Covers theories of learning. Mon., 8:10 to 10:00 P.M.

Education 225 *Elementary School Reading* (3)

Coleman

For experienced teachers. Developmental and remedial approaches to reading problems. Demonstrations of diagnostic and corrective techniques used in the Reading Clinic. (Not offered in 1955-56.)

Psychology 225 *Seminar: Mental Hygiene* (3)

Caldwell

A study of mental health problems with special attention to programs of prevention. Tues., 8:10 to 9:00 P.M.

Education 227 *Elementary Education** (3)

La Bae

Careful appraisal of present-day programs, objectives, organization, in light of the changing teaching methods and curriculum. Sat., 9:00 to 1:00 A.M.

Psychology 227x *Seminar: Counseling and Guidance* (3) Dreese

Recent developments and current problems in vocational, educational, and personal guidance in various types of agencies with particular reference to education. Prerequisite: educational or psychological measurements and procedures. Tues. of the summer session. Evening.

* Prerequisite: adequate postsecondary preparation.

Education 228 Methods in Elementary Education (3) La Bue
For prospective teachers. Improvement of classroom procedures in the six basic areas of the elementary school program, treating individual differences, evaluating group processes. Sat., 9:15-11:30 AM

Psychology 228 Seminar: Techniques of Counseling (3) Dreesse
Specific types of vocational, educational, and personal counseling problems approached through the case method. Prerequisite: recent previous course in counseling and guidance and familiarity with individual analysis methods. Evening

Education 229A Administration of Elementary Education (3) La Bue
For prospective teachers and administrators. Administration as a means of achieving educational objectives, organizing learning and teaching activities, leading, supervising and evaluating, maintaining the building, and integrating school and community life. Emphasis upon working with action. Thurs., 7:15-9:15 PM

Psychology 229A Seminar: Occupational and Educational Information (3) Faith
Designed to acquaint vocational and educational counselors with the basic concepts and theoretical information necessary to understand sources of data and techniques of collecting, analyzing and disseminating for purposes of evaluation. Evening

Education 231 Secondary School Classroom Procedures* (3) Bish
Survey of current classroom practices with particular attention to selected topics such as teacher-pupil planning, group procedures, pupil security, initiative and culminating activities, individual and group evaluation techniques, discipline, etc. Review of recent literature. Thurs., 7:15-9:15 PM

Psychology 231 Test Construction (3) Hunt
The principles underlying test construction; statistical techniques in the construction, evaluation, and standardization of psychological, educational, and vocational tests. Prerequisite: a course in tests and measurements and a course in statistics. Thurs., 8:15-10:15 PM

Psychology 232 Research: Test Construction (3) Hunt
Individual projects in construction and evaluation of psychological, educational, or vocational tests. Prerequisite: Psychology 231. Open each term to individual study plans to a small number of students by permission of the instructor. Time to be arranged.

Education 233A Individual Education* (3) J. Johnson
Study of individual materials in learning, selection, evaluation, and use of materials; presentation of problems in the area; selection, maintenance, and use of individual materials and equipment. Material fee, \$5. Lecture—Sat., 11:15-1:15 AM. Laboratory—Sat., 11:15 AM-2:15 PM.

*Prerequisite: adequate professional preparation.

Psychology 233 *Individual Psychological Testing*

E. Johnson

(3)

Instruction and practice in giving the Binet Test and the Wechsler-Bellevue Test. Emphasis is placed on testing children and adolescents. Prerequisite: an elementary course in tests and measurements. Material fee, \$5. Fee, 4.12 to 6.00 P.M.

Psychology 233x, same as 233, offered spring term. Afternoon.

Education 239 *Teaching the Core Curriculum* • (3)

Bish

An examination and study of classroom teaching procedures appropriate to the core program. (Not offered in 1955-56.)

Education 243 *Human Relations in the Classroom* • (3)

Principles and practices involved in interpersonal relationships between learner and teacher and among learners. (Not offered in 1955-56.)

Education 251 *Guidance in Secondary Schools* • (3)

Brennher

Scope, needs, organization of the program, services to students, the instructional staff, and the administrative personnel needed for the program. Mon., 7:12 to 9:12 P.M.

Education 254 *The Junior High School* • (3)

Bish, Root

Purposes, organization, core programs, guidance, developing course of study, extra-classroom activities. (Not offered in 1955-56.)

Education 255-56 *Secondary Education* • (3-3)

Root

Fall term: Current proposals for the reorganization of secondary education. Spring term: Current problems in each of the sub-extended fields. Sat. 11:15 A.M. to 1:00 P.M.

Education 259-60 *Secondary School Management* • H. Johnson

(3-3)

For experienced teachers and administrators with two years of successful teaching in secondary schools. Management planning, execution, and control; criteria of good management; study of the teacher's role in the group; problems incident to the development of new policies and programs. Fall term: Wed. 5:00 to 7:00 P.M., 5 meetings. Spring term: 9:15 P.M.

Education 263-64 *Employee Training* (3-3)

Root

Fall term: nature and purposes, organization and administration of the training operation, employee's experience, apprenticeship, and other training methods and techniques, coordination with other management functions. Spring term: current problems, incentive policies, and programs of school improvement. Prerequisite: adequate professional preparation or two years of experience in employee training. Wed. 7:12 to 9:12 P.M.

Education 270 *An Education* (3)

Nowell

For experienced teachers. Basic philosophies of modern art education and of visual and verbal studies, emphasis on creative ability, design, and the elementary processes. Designed to increase awareness in the creative process. Prerequisite: Education 111. Thurs. 6:15 to 9:15 P.M.

* Prerequisite: adequate professional preparation.

Education 271 *The Teacher and School Administration* • Fox

(3)

A survey course for teachers and prospective administrators. Education and world affairs, national agencies, role of the state, local administration, school finance, legal controls, school plant, public support, democratic administration, procedures for improving teaching conditions. Sat., 9:15 to 11:00 A.M. 15 small group meetings to be arranged.

Education 272 *The Teacher and School Supervision* • Fox

(3)

Nature, organization, human relationships, and techniques. Sat., 9:15 to 11:00 A.M. 15 small group meetings to be arranged.

Education 276 *Seminar: Public Relations in School Administration* • (3) Root

Purposes, gathering materials, disseminating agencies, publicity media, public relations in public schools. (Not offered in 1955-56.)

Education 278 *School Law* • (3) Remmlein

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group. Tues., 7:35 to 9:35 P.M.

Education 279-80 *Adult Education* • (3-3) Ruffner

Full term: current concepts and objectives, agencies involved, programs on all levels—international through community. Spring term: the adult as a learner, the teacher of adults, management activities, administration of adult education programs. Tues., 7:35 to 9:35 P.M.

Education 281 *Group Procedures in Education* • (3) Ruffner

Group theory, organization, and application to all educational levels. (Not offered in 1955-56.)

Education 285 *Extra-classroom Activities* • (3) Root

Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contests; particular attention to sponsorship, participation, finance, and evaluation. (Not offered in 1955-56.)

Education 287-88 *Clinical Study of Reading Problems* • Coleman

(3-3)

For advanced students. Diagnostic and corrective work under supervision of the Reading Clinic. Each student is expected to diagnose and treat pupils who are retarded in reading. Case studies are presented and critiqued. Prerequisite: Education 211-24 or the equivalent. Education 287-Monday, 8:00 A.M. to 1:00 P.M. Sat., 11:00 A.M. to 1:00 P.M.

Education 289-90 *Supervisory Problems in Reading* • Coleman

(3-3)

For experienced teachers, principals, supervisors, and superintendents. Considers the problems involved in planning, conducting, and improving the reading program in promoting cooperative effort on the part of the staff toward adequate professional preparation. (Not offered in 1955-56.)

*Prerequisite: adequate professional preparation.

Education 291x *Planning the School Plant* (3)

Selection of site, evaluation of existing buildings, utilization of present facilities, adaptation to particular needs, building, operation, and maintenance problems. Fri., 7:10 to 9:00 p.m. Hansen

Education 293-94 *Research* (3-3)

Individual research under the guidance of a member of the Staff. Program and conferences arranged with an instructor. Time to be arranged. The Staff

Education 295 *Educational Research Methods and Procedures* (3)

Required of all Master of Arts candidates following Plan 2. Knowledge of elementary statistics required. Tues., 5:10 to 7:30 p.m. J. H. Fox
Education 295x, same as 295, offered spring term. Fri., 5:10 to 7:00 p.m.

Education 297 *Reading in Education*

To assist those preparing for the comprehensive examination. No credit toward degree requirements. Tues. & Wed., 5:10 p.m. The Staff
Education 297x, same as 297, offered spring term. Wed., 5:10 p.m.

Education 299-300 *Thesis* (3-3)

Required of all Master of Arts candidates following Plan 1. Time to be arranged. The Staff

DEPARTMENTS OF PHYSICAL EDUCATION

The following courses are offered by the Department of Physical Education for Men and the Department of Physical Education for Women. Whenever possible the departments offer lecture courses jointly.

FIRST GROUP

43-44 *Techniques of Physical Education Motor Activities* (2-2)

Fundamental skills, rules, and organization. Locker and towel fee, \$1.50 a term. Section A (women). Time to be arranged; section B (men). Tues. and Thurs., 10:10 to 12:05 a.m. The Staff

45-46 *Methods and Materials for Teaching Individual and Dual Sports in Secondary Schools* (2-2) (men)

Tennis, golf, swimming, wrestling, badminton, bowling. Locker and towel fee, \$1.50 a term. Tues. and Thurs., 10:10 to 12:05 a.m. The Staff

47 *Introduction to Physical Education* (2)

An orientation course presenting the problems of physical education, vocational interests, scientific foundations, and scope of field. Tues. and Thurs., 8:10 a.m. Krupa

48 *Introduction to Recreation* (2)

The role of recreation in modern living; current practices in community recreation work; standards of training, experience, and salary; types of recreation. Time to be arranged. Hansen

* The locker and towel fee is required for registration in one or more of the activities listed.

- 40 *Human Anatomy* (3) Stallings
The structure of the human body. Basic course for physical education majors. Also open to both men and women not majoring in physical education. Prerequisite: Biology 1-2 or Zoology 1-2. Mon., Wed., and Fri., 9-12 A.M.
- 50 *Kinesiology* (3) Lawrence
A study of the anatomical mechanism of movement, analysis of the action of muscles in physical education activities. Prerequisite: an approved course in anatomy. Morning.
- 51-52 *Methods and Materials for Teaching Sports in Secondary Schools and Colleges* (2-2) The Staff
(women)
Team sports: basketball, hockey, softball, soccer, speedball, volleyball. Individual and dual sports: badminton, tennis, golf, archery, canoeing. Locker and towel fee* \$4.50 a term. Time to be arranged.
- 53 *First Aid and Care of Athletic Injuries* (2) De Angelis, Lawrence
Prevention and emergency care of injuries of all types, with special reference to first aid, civil defense, first aid, massage. A practical course. Prerequisite: Biology 1-2 or Zoology 1-2. Afternoon.

SECOND GROUP

- 101 *Physical Education in the Elementary School* (3) Atwell, Burtner
Physical growth and development of the child and adolescent. Survey of age characteristics and organization of physical education activities for the various age levels in elementary school, playground, and settlement house programs. Methods and materials of tumbling, games, tennis, and swimming activities. Section A: Lecture—Fri., 1-4 P.M.; laboratory—Fri., 2-4 P.M.; section B: Lecture—Tues., 5-8 P.M.; laboratory—Tues., 7-10 P.M.
- 103 *History and Principles of Physical Education* (3) Atwell, Krupa
Survey of history as it relates to contemporary physical education. Study of aims, objectives, and philosophy of physical education. Mon., Wed., and Fri., 11-1 A.M.
- 105-6 *Corrective Physical Education and Physical Examinations* (3-3) Lawrence
Cause and correction of faulty body mechanics, physical examination methods for the diagnosis of postural defects, prescription of exercises and program adaptation. Prerequisite: Biology 1-2 or Zoology 1-2. Mon., Wed., and Fri., 1-4 P.M.

*The locker and towel fee is required for registration in one or more of the activity courses.

- 107 *Techniques for Teaching Recreational Dance (1)* Burtner
 Methods and materials for teaching the country and social dances of America and the folk dances of other countries to secondary school age and adult groups. Square-dance calling is included. Locker and towel fee.* \$3.50 a term. Tues. and Thurs., 9:10 A.M.
- 109-10 *Leadership Organization in the Intramural Program (2-2)* De Angelis
 Principles of administration, organization, and supervision of intramural activities in the physical education program of the junior high school, senior high school, and college. Tues. and Thurs., 1:10 P.M. Laboratory to be arranged.
- 111-12 *Methods and Materials for Teaching Physical Education Activities in Secondary Schools and Colleges (1 to 2-1 to 2)* The Staff
 Continuation of methods and materials in activities listed under Physical Education 51-52. Locker and towel fee.* \$3.50 a term. Afternoon, 1956-57 and alternate years.
- 113-14 *Methods and Practice in Teaching Physical Education Activities (2 to 4-2 to 4)* The Staff
 Principles and methods applied to learning and teaching physical education activities. Supervised laboratory. Locker and towel fee.* \$3.50 a term. Tues. and Thurs., 1:10 P.M., laboratory to be arranged.
- 115-16 *Methods and Materials for Teaching Team Sports in Secondary Schools (2 to 4-2 to 4)* The Staff
 Football, basketball, baseball, track and field. Locker and towel fee.* \$3.50 a term. Tues. and Thurs., 11:10 A.M.
- 117 *Methods of Teaching Modern Dance (1 to 2) (women)* Burtner
 Techniques for the teaching of movement as a medium of expression. Practical work in body technique, composition, and the analysis of accompaniment for dance including instrumental, voice, and percussion. Application is made to both secondary school and adult age levels. Locker and towel fee.* \$3.50 a term. 1956-57 and alternate years.
- 118 *Dance Production (1 to 2)* Burtner
 Choreography for dance concerts, musicals, and plays. The planning and staging of dance for TV, dance demonstrations, and folk festivals. Lighting, costumes, sets, make-up for dance performances. Locker and towel fee.* \$3.50 a term. 1956-57 and alternate years.
- 121 *School and Community Health Programs (3)* Krupa
 Health services, healthful environment, health instruction, sources of material for general health knowledge. Prerequisite: Biology 1-2 or Zoology 1-2. Mon. and Fri., 12:45 to 2:00 P.M.

* The locker and towel fee is required for registration in one or more of the activity courses.

- 122 *Methods and Materials of Health Education* (3) Atwell
Organization and presentation of health materials for each age level. Prerequisite: Biology 1-2 or Zoology 1-2. Evening.
- 131 *Tests and Measurements in Physical Education* (3) Atwell
Critical survey of tests in physical activities, methods of test construction, elementary statistics. Mon., Wed., and Fri., 9:10 A.M.
- 132 *Camp Leadership* (1) Atwell, Stallings
Survey course in camp counseling. Afternoon.
- 133-34 *Observation and Student Teaching* (3-3 to 6) Atwell, Myers
Assignments are made to schools in Washington and the vicinity. Physical Education 134, student-teaching fee, \$35. Time to be arranged.
Education 134X, same as 134, offered fall term. Time to be arranged.
- 136 *Survey of Dance History and Dance Forms* (3) Burtner
The development of dance from primitive ritual to present day recreational and art forms of the dance. Includes ethnologic dance, practice and discussion of fundamental movement techniques, and composition. 1956-57 and alternate years.
- 138 *Organization and Administration of Physical Education* (3) Atwell, Myers
Organization and administration of physical education programs in elementary and secondary schools and in colleges. Study of plants, fields, equipment, and programs. Morning.
- 151-52 *Recreational Leadership Activities* (1 to 3-1 to 3) Christiansen
Fall term: basic skills for the pre-school and school-age child. Laboratory practice in crafts, music, dramatics, physical and social activities. Spring term: basic skills for the teen-age and adult. Arts and crafts, dramatics, physical and social activities. (Not offered in 1955-56.)
- 161 *Community Organization for Recreation* (3) Christiansen
Resources, principles, and methods in organizing community recreation services. 1956-57 and alternate years.
- 162 *Administration of Community Recreation Programs* (3) Christiansen
Factors and problems in administering recreation including surveys, legislation, program, area, facilities, leadership, finance, and public relations. 1956-57 and alternate years.

SCHEDULE OF CLASSES

FALL TERM 1955-56

CLASSES MEETING ONCE A WEEK

MONDAY

1:10-3:00 P.M.	Ed. 100A: Learning and Teaching
5:10-8:00 P.M.	Ed. 121B: Society and the School
7:10-9:00 P.M.	Ed. 217: Contemporary Problems in Education
7:10-9:00 P.M.	Ed. 251: Guidance in Secondary Schools
8:10-10:00 P.M.	Psych. 223: Seminar: Learning

TUESDAY

5:10-6:00 P.M.	P.E. 101B: Physical Education in the Elementary School (Lecture)
5:30-7:30 P.M.	Ed. 225: Educational Research Methods and Procedures
6:10-8:00 P.M.	Psych. 225: Seminar: Mental Hygiene
7:10-9:00 P.M.	P.E. 101B: (Laboratory)
7:35-9:35 P.M.	Ed. 213: History of Education
7:35-9:35 P.M.	Ed. 270: Adult Education
8:10-10:00 P.M.	Psych. 211: Test Construction

WEDNESDAY *

1:10-3:00 P.M.	Ed. 121A: Society and the School
5:10-7:00 P.M.	Ed. 227: Reading in Education
6:10-8:00 P.M.	Ed. 100B: Learning and Teaching
7:10-9:10 P.M.	Ed. 223: Reading Problems
7:10-9:10 P.M.	Ed. 203: Employee Training

THURSDAY

6:10-9:00 P.M.	Ed. 113: Elementary School Art
6:10-8:00 P.M.	Psych. 120: Introduction to Counseling and Guidance
7:35-9:35 P.M.	Ed. 241: Secondary School Classroom Procedures
7:35-9:35 P.M.	Ed. 278: School Law

FRIDAY

1:10-2:00 P.M.	P.E. 101A: Physical Education in the Elementary School (Lecture)
2:10-4:00 P.M.	P.E. 101B: (Laboratory)
4:10-6:00 P.M.	Psych. 231: Individual Psychological Testing
7:10-9:00 P.M.	Ed. 115: Elementary School Reading
7:10-9:10 P.M.	Ed. 202: Child Growth and Development

SATURDAY

9:10-11:00 A.M.	Ed. 117: Elementary School Science
9:10-11:00 A.M.	Ed. 227: Elementary Education
9:10-11:00 A.M.	Ed. 271: The Teacher and School Administration
11:10 A.M.-1:00 P.M.	Ed. 225: The Curriculum
11:10 A.M.-1:00 P.M.	Ed. 253: Secondary Education
11:10 A.M.-1:00 P.M.	Ed. 287: Current Studies in Reading Problems

* Ed. 200 will have ten meetings: five from 5:10 to 6:00 p.m. and five from 6:10 to 7:00 p.m.

CLASSES MEETING TWICE A WEEK

MONDAY AND WEDNESDAY

- 8:30-10:00 A.M. Ed. 111 and 131: Elementary School Curriculum
10:00-11:30 A.M. Peds. 26: Child Psychology

MONDAY AND FRIDAY

- 8:30-10:00 A.M. P.E. 121: School and Community Health Practices

TUESDAY AND THURSDAY

- 8:30-10:00 A.M. P.E. 47: Interdisciplinary in Physical Education
10:00-11:30 A.M. P.E. 107: Techniques for Teaching Recreational Dance
11:30-12:30 P.M. P.E. 43B: Techniques of Physical Education Motor Activities
12:30-2:00 P.M. P.E. 45 (Men): Methods and Materials for Teaching Intramural and Dual Sports in Secondary Schools
2:00-3:30 P.M. Ed. 131: Common Teaching Skills
3:30-5:00 P.M. P.E. 136: Leadership Organization in the Intramural Program
5:00-6:30 P.M. P.E. 118 (Men): Methods and Materials for Teaching Team Sports in Secondary Schools
6:30-8:00 P.M. Peds. 141: Psychological Tests
8:00-9:30 P.M. Peds. 248: Introduction to Educational Psychology
9:30-11:00 P.M. Stats. 178: Social Correlation
11:00-12:30 A.M. Peds. 144A: Personality Psychology

CLASSES MEETING THREE TIMES A WEEK

MONDAY, WEDNESDAY, AND FRIDAY

- 8:30-10:00 A.M. P.E. 46: Human Anatomy
10:00-11:30 A.M. P.E. 131: Tests and Measurements in Physical Education
11:30-12:30 P.M. P.E. 135: Creative Physical Education and Physical Education
12:30-2:00 P.M. P.E. 133: History and Principles of Physical Education
2:00-3:30 P.M. Peds. 141: Leadership, Group Behavior, and Student Life

SPRING TERM 1955-56

CLASSES MEETING ONCE A WEEK

MONDAY

- 8:30-10:00 A.M. Ed. 111A: Learning and Teaching
10:00-11:30 A.M. Ed. 142B: Science and the School
11:30-12:30 P.M. Ed. 120: Elementary School Arithmetic
12:30-2:00 P.M. Ed. 126: Teaching English
2:00-3:30 P.M. Ed. 248: Contemporary Problems in Education

TUESDAY

- 8:30-10:00 A.M. Ed. 140: Teaching Mathematics
10:00-11:30 A.M. Ed. 145: Teaching Foreign Languages
11:30-12:30 P.M. Ed. 128: Children's Literature
12:30-2:00 P.M. Ed. 204: History of Education
2:00-3:30 P.M. Ed. 206: Adult Education

WEDNESDAY *

1 1-3 P.M.	Ed. 122A: Society and the School
5 1-6 P.M.	Ed. 227K: Reading in Education
6 1-8 P.M.	Ed. 111B: Learning and Teaching
7 1-9 P.M.	Ed. 224: Reading Problems
7 1-9 P.M.	Ed. 264: Employee Training

THURSDAY

5 1-7 P.M.	Ed. 144: Teaching Science
6 1-9 P.M.	Ed. 27: Art Education
7 1-9 35 P.M.	Ed. 114: Elementary School Music
7 1-9 35 P.M.	Ed. 118: Teaching Social Studies
7 1-9 35 P.M.	Ed. 225X: Administration of Elementary School Education

FRIDAY

5 1-7 P.M.	Ed. 295X: Educational Research Methods and Procedures
7 1-9 P.M.	Ed. 116: Elementary School Social Studies
7 1-9 P.M.	Ed. 210: Child Growth and Development
7 1-9 P.M.	Ed. 214: Planning the School Plant

SATURDAY

9 1-11 A.M.	Ed. 228: Elementary Education
9 1-11 A.M.	Ed. 233X: Audio-Visual Education (Lecture)
9 1-11 A.M.	Ed. 272: The Teacher and School Supervision
11 1-1 P.M.	Ed. 266: The Curriculum
11 1-1 P.M.	Ed. 211X: Audio-Visual Education (Laboratory)
11 1-1 P.M.	Ed. 126: Secondary Education
11 1-1 P.M.	Ed. 288: Clinical Study of Reading Problems

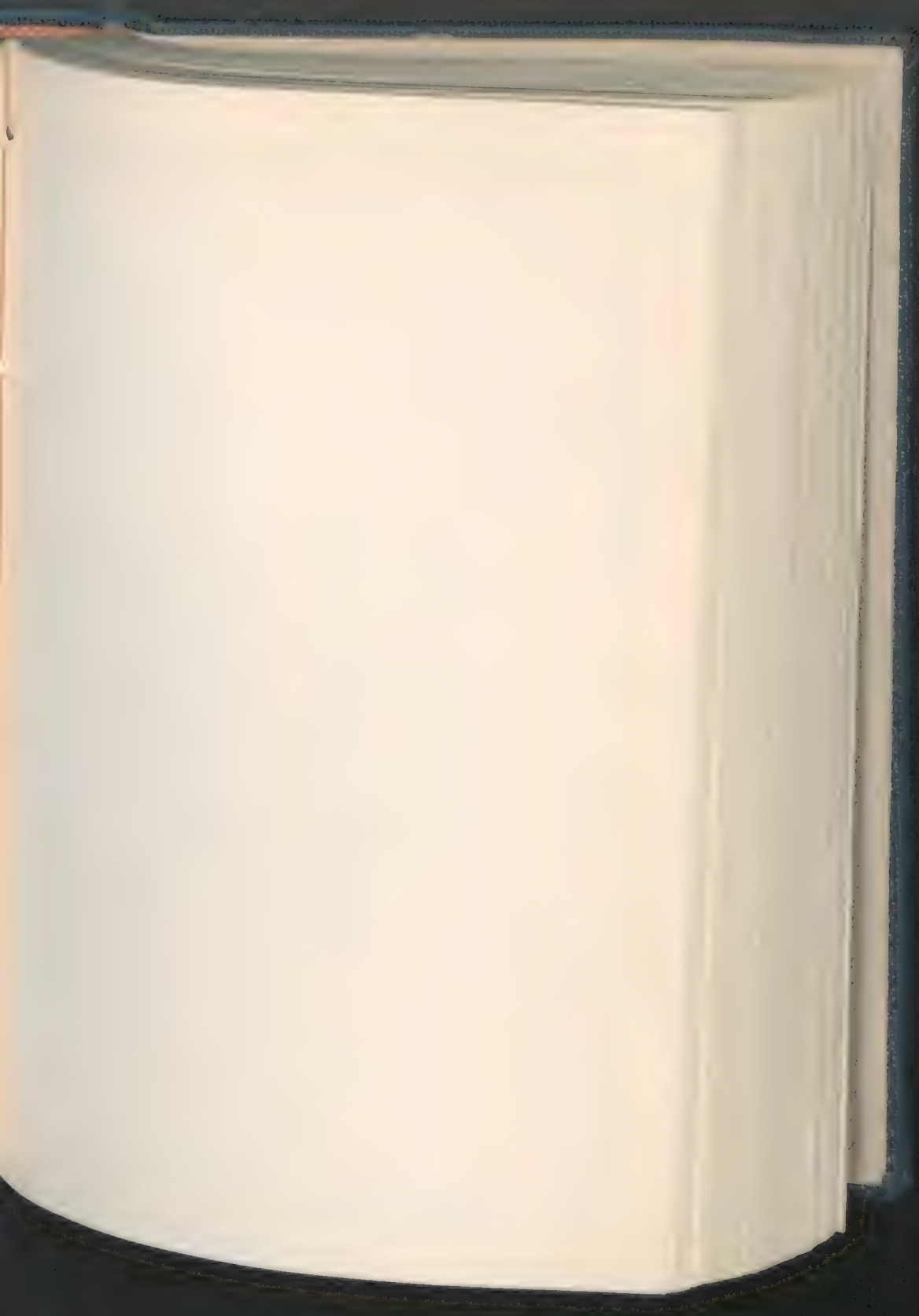
CLASSES MEETING TWICE A WEEK**TUESDAY AND THURSDAY**

10 10-12 A.M.	P.E. 44: Techniques of Physical Education Motor Activities
10 10-12 A.M.	P.E. 46: Methods and Materials for Teaching Individual and Dual Sports in Secondary Schools

CLASSES MEETING THREE TIMES A WEEK**MONDAY, WEDNESDAY, AND FRIDAY**

9 1-12 A.M.	P.E. 131: Tests and Measurements in Physical Education
10 1-11 A.M.	P.E. 126: Co-operative Physical Education and Physical Examinations

* Education 264 will have ten meetings: five, from 8 to 10:00 p.m., five, from 10:00 to 12:00 p.m.



THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, D. C.

Report of the Treasurer

FOR THE YEAR ENDED
AUGUST 31, 1955

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LETTER OF TRANSMITTAL

November 30, 1955

TO THE PRESIDENT AND THE BOARD OF TRUSTEES
THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, D. C.

GENTLEMEN:

I am submitting herewith the Report of the Treasurer of The George Washington University for the fiscal year ended August 31, 1955. This report is a review of the budget operations for the year and is based on the budget approved by the Board of Trustees of the University.

The accounts of the University are kept and its financial reports arranged insofar as practicable in conformity with the recommendations of the National Commission on Standard Reports for Institutions of Higher Education. Under that plan the funds of the University are classified in various fund groups, and the accounts and financial statements segregate clearly the assets and liabilities of each of these groups as indicated by the balance sheet, Exhibit A.

R. G. Reiter & Co. have examined the accounts of the University for the past year, and their certificate is submitted herewith.

A condensed summary of the principal facts in the report is presented below and on succeeding pages, followed by detailed Exhibits and Schedule.

Respectfully submitted,
HENRY W. HERZOG
Treasurer

CONDENSED SUMMARY

CURRENT FUNDS—UNRESTRICTED

These funds represent assets which are available for immediate use in the current operation of the University.

Current Income for the Year (Exhibit B and Schedule 1)

Current Expenses for the Year (Exhibit B and Schedule 2)

11,828,249 28

11,041,821 96

Excess of Current Income over Current Expenses (Exhibit B)

786,427 32

The latter amount was added to Current Funds Surplus. Surplus at the end of the year amounted to \$1,210,341.28 (Exhibit B). During the year there was transferred from Surplus to Non-Investment in Plant \$212,748.71 for the purchase of land and buildings, \$79,288.15 for the purchase of equipment, and \$14,004.88 for the purchase of trust assets payable.

Non-Payable of \$100,000.00 were paid on July September 1, 1957. (Schedule 3).

Assets Restricted in the amount of \$1,144,642.29 include \$747,389.10 for from research contracts, and \$397,056.28 for the Hospital (Schedule 3). Of this latter amount \$164,959.42 is due from patients still in the Hospital, and from Group Health Insurance and other agencies for the University. The remainder represents past due accounts against which a reserve of \$170,000.00 has been provided to cover possible collection losses.

Prepaid Expenses of \$267,044.94 include \$128,799.94 at the University and \$138,245.03 at the Hospital (Schedule 3).

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CURRENT FUNDS—RESTRICTED

Research grants, investment income, gifts, and agency funds comprise these funds which consist of current expendable assets, limited as to disposition (Exhibit C and Schedules 10, 10A, 10B, 10C).

During this year restricted gifts and grants for use as specified amounted to \$3,449,748.87 (page 96). Unexpended Restricted and Agency Funds totaled \$531,008.33 (Exhibit C).

LOAN FUNDS

For the assistance of students seeking financial aid, loan funds have been established by the University and other organizations (Schedule 4). Loans are made at a low rate of interest and when repaid the interest is added to the principal of the funds.

During the year, 4% loans were made to students. Loan funds totaled \$40,611.42.

ENDOWMENT FUNDS

The principal of endowment funds amounted to \$3,679,638.14 (Exhibit E), an increase of \$153,565.61. These funds are represented by assets which, under the terms of wills, deeds of gift, or under the by-laws of the University, must be held in perpetual trust for academic or living purposes. The principal amount and changes during the year are recorded in Schedule 12.

"Consolidated Endowment Funds" consisted of 126 endowments with a total value of \$2,249,466.63 (Schedule 5). The assets of these funds are combined to eliminate the possibility of partial or total loss of any fund through the failure of a specific investment, and to avoid temporary suspension of income and the carrying of uninvested small cash balances, and to give equality of treatment to all funds. Unless otherwise restricted by the donors, the assets of all new endowments are added to the assets of the Consolidated Endowment Funds.

Reserves for Protection of Investments were as follows: Consolidated Endowment Funds, \$96,979.93; Scottish Rite Fund, \$58,458.64 (Schedule 12).

Earnings of Consolidated Endowment Funds are recorded in one income account and at the end of the year are distributed to the participating funds in the proportion each fund bears to the total of the entire group. The rate of return on the investments of these funds amounted to 4.982% during the past year.

The Scottish Rite Endowment Fund earned 5.088% net income on its investments during the year just ended.

Net income of all endowment funds for the year was \$176,514.61 (Schedule 10A - Page 3).

Pledges to the Society of Medicine Endowment Fund on August 31, 1955, totaled \$231,199.00.

PLANT FUNDS - UNEXPENDED

Cash and other assets for development of the physical plant comprise these funds (Schedule 7). At the end of the year the balance was \$953,183.25 (Exhibit F).

Since the creation of the Tompkins Hall of Engineering Building Fund in 1946, gifts by Mr. Charles H. Tompkins and the late Mrs. Ida R. Tompkins, and income earned from the investment thereof, totaled \$527,400.32. After payment of construction costs of \$48,906.41, the balance in the Fund as of August 31, 1955, was \$478,493.91.

PLANT FUNDS INVESTED IN PLANT

EXHIBITS A AND G, SCHEDULES 8, 9 AND 9	BALANCE		Net Assets	Depreciation	BALANCE After 31, 1955
	1954	1955			
Land and Buildings	17,150,025.78	90,000.12	17,250,024.85		
Equipment	1,902,257.45	67,042.15	2,009,327.60		
Trust Notes Payable	708,842.80		618,457.92		
Due to Restriction Funds	57,150.00		57,150.00		
Net Investment in Plant	18,359,221.53	304,673.15	18,663,894.68		

AUDIT CERTIFICATE

November 30, 1955

To the President and the Board of Trustees
The George Washington University
Washington, D. C.

We have examined the balance sheet of THE GEORGE WASHINGTON UNIVERSITY as of August 31, 1955, and the related statements of current income and expense, current funds surplus, and prior fund transactions for the fiscal year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. It was not applicable to confirm receivables from United States Government Agencies, but we have applied other auditing procedures in verification of this aspect.

In our opinion, the balance sheet and related statements of current income and expense, current funds surplus, and other fund transactions included in the accompanying REPORT OF THE TREASURER OF THE UNIVERSITY, present fairly the financial position of THE GEORGE WASHINGTON UNIVERSITY as of August 31, 1955, and the results of its operations for the fiscal year then ended, in conformity with generally accepted principles of university and college accounting as applied on a basis consistent with that of the preceding year.

R. G. RANKIN & Co.
CERTIFIED PUBLIC ACCOUNTANTS

THE GEORGE WASHINGTON UNIVERSITY

BALANCE SHEET

August 31, 1955

CURRENT FUNDS

ASSETS

CASH	212,208.44
NOTES RECEIVABLE (Schedule 3)	76,500.00
ACCOUNTS RECEIVABLE	1,144,642.29
(Schedule 3)	267,041.94
PREPAID EXPENSE (Schedule 3)	1,700,395.67

RESTRICTED

CASH	434,471.33
INVENTORY—GIFT SHOP.....	6,627.00
INVESTMENTS (Schedule 3)	90,000.00

CASH	15,002.27
LOANS RECEIVABLE (Schedule 4)	25,609.15

LIABILITIES

UNRESTRICTED

NOTES PAYABLE (Schedule 3)...	300,000.00
ACCOUNTS PAYABLE.....	97,347.02
DEFERRED INCOME.....	92,707.37
SURPLUS (Exhibit B)	1,210,341.28

531,098.35	PRINCIPAL OF FUNDS (Exhibit C)
------------	--------------------------------

LOAN FUNDS

40,611.42	PRINCIPAL OF FUNDS (Exhibit D)
-----------	--------------------------------

40,611.42

ENDOWMENT FUNDS

CASH	50,155.10
INVESTMENTS (Schedule 5)	3,257,770.17
FUND HOLDER TRUST BY OTHERS (Schedule 6)	3,307,925.27
	<u>371,712.87</u>
	3,679,658.14

PRINCIPAL OF FUNDS (Exhibit E)

3,679,658.14

PLANT FUNDS

UNEXPENDED

CASH	70,994.44
INVESTMENTS (Schedule 7)	882,188.81
	<u>953,183.25</u>
	953,183.25

PRINCIPAL OF FUNDS (Exhibit F)

953,183.25

INVESTED IN PLANT

LAND AND BUILDINGS (Schedule 8)	17,250,024.85
EQUIPMENT (Schedule 9)	<u>2,029,327.60</u>
	19,279,352.45

TRUST NOTES PAYABLE
(Schedule 8A)

618,457.92

NET INVESTMENT IN PLANT
(Exhibit G)

18,660,894.53

19,279,352.45

TOTAL

26,184,279.26

TOTAL

26,184,279.26

EXHIBIT A

SUMMARY OF CURRENT INCOME AND EXPENSE

For the Year Ended August 31, 1955

Income (Schedule 1)		
Endowment and General		3,104,319.82
Student Fees		156,220.78
Investments		80,178.35
Gifts		87,678.75
Student Activities		303,262.42
Manufactures		3,423,035.48
Organized Research		4,125,966.99
Honors		
Auxiliary Institution		11,321,092.59
		<u>507,186.69</u>
		11,828,249.18
Expense (Schedule 2)		
Endowment and General		862,600.28
Administrative and General		2,041,585.06
Instruction		137,743.79
Libraries		580,817.22
Manufactures and Operation of Plant		413,158.83
Student Activities		3,423,035.48
Organized Research		3,826,162.36
Honors		
Auxiliary Institution		11,185,864.72
Student Fees		457,282.35
		<u>40,344.60</u>
		11,683,491.37
		<u>641,670.01</u>
		11,041,821.06
Loss reimbursement of overhead included above		
		786,427.32
ANNUAL OF CURRENT INCOME OVER CURRENT EXPENSE		

SUMMARY OF SURPLUS

For the Year Ended August 31, 1955

	HOSPITAL WORKING FUNDS	UNAPPORTIONED	TOTAL EXPENDITURE
BALANCE AUGUST 31, 1954	1,210,341.28	548,585.70	1,758,926.98
ADDITIONS			
Excess of Current Income over Current Expenses	359,042.65	447,384.69	786,427.32
Reconciliation for Discrepancies in Hospital Budget and Expenditure (Exhibit C)	188,400.00		188,400.00
Adjustment of 1954-55 income and expense	83,000.00	1,83,000.00	2,663,000.00
DISPOSITIONS			
Transferred to Net Investment in Plant—Exhibit C	611,112.56	563,714.76	1,174,827.32
Land and Building	63,848.71	155,000.00	218,848.71
Equipment	74,572.27	4,715.88	79,288.15
Fund Notes Callable	114,420.98	14,034.88	128,455.86
		174,420.76	313,071.74
BALANCE AUGUST 31, 1955	499,746.27	740,392.01	1,240,138.28

Exhibit B

SUMMARY OF RESTRICTED CURRENT FUNDS PRINCIPAL

For the Year Ended August 31, 1955

	ORGANIZED RESEARCH (Schedule 10) (Schedule 10A)	INVESTMENT INCOME (Schedule 10B) (Schedule 10C)	MISCEL- LANEOUS (Schedule 10D)	AGENCY (Schedule 10E)	TOTAL EXHIBIT A
BALANCE AUGUST 31, 1954	335,952.57	78,393.01	191,522.34	9,880.34	615,748.26
ADDITIONS					
Grants, receipts, deposits	3,381,176.42	...	65,394.83	35,784.30	
Investment income	...	191,463.54	450.00	...	
	3,381,176.42	191,463.54	65,844.83	35,784.30	3,674,269.19
DISBURSMENTS					
Salaries	2,124,632.31	...	367.00	...	
Fees	1,296,403.17	...	9,079.40	...	
Scholarships, fellowships	...	9,107.80	280.00	...	
Printing	...	1,249.35	...	...
Travel	...	36.59	...	...
Fish and Game Net Investment in Plant	...	162,201.72	68,920.85	...	
Schedule 10B—Restricted Investment in Plant	...	450.00	...	...
Schedule 10B—Restricted Investment in Plant	...	2,712.49	18,385.43	...	
Schedule 13—Plant Fund	...	6,800.99	...	...
National University merger	...	...	21,083.82	...	
Withdrawals	3,422,035.48	192,608.94	118,116.50	35,128.10	3,758,889.02
	294,093.51	87,247.61	130,250.67	10,506.54	531,098.33
BALANCE AUGUST 31, 1955					

SUMMARY OF LOAN FUNDS PRINCIPAL

For the Year Ended August 31, 1955

BALANCE AUGUST 31, 1954			
ADDITIONS (Schedule D)			38,361.79
Gifts			
Interest on loans	1,830.84		
	<u>500.19</u>		
		2,340.03	
		<u>40,701.82</u>	
DEDUCTIONS (Schedule D)			
Loan charged off			90.40
			<u>40,611.42</u>
BALANCE AUGUST 31, 1955 - EXHIBIT A			

EXHIBIT D

SUMMARY OF ENDOWMENT FUNDS PRINCIPAL

For the Year Ended August 31, 1955

BALANCE August 31, 1954	3,526,072.53
ADDITIONS (Subtotal 12)	
Cash	116,586.88
Investment Income	2,712.49
Net gain on sale of investments	15,881.81
Gifts by National University Alumni	18,385.43
	<u>153,566.61</u>
	3,679,639.14
DEBIT (Subtotal 12)	
Amount withdrawn	<u>1.00</u>
BALANCE August 31, 1955 - Exhibit A	<u>3,679,638.14</u>

SUMMARY OF PLANT FUNDS PRINCIPAL

For the Year Ended August 31, 1955

BALANCE AUGUST 31, 1954			894,404.62
ADDITIONS (Schedule I)			
Cash			
Imports (Schedule I)	176,805.58		
	<u>2,800.00</u>		<u>183,605.57</u>
			1,048,011.19
DISBURSMENTS (Schedule I)			
Land and Buildings - Incurred by Plant - Excluding G			
Equipment - Incurred by Plant - Excluding G	52,847.41		
Transportation Schedule I	<u>23,982.47</u>		<u>76,829.88</u>
			94,827.94
BALANCE AUGUST 31, 1955 - EXHIBIT A			<u>953,183.25</u>
			1,048,011.19

SUMMARY OF NET INVESTMENT IN PLANT

For the Year Ended August 31, 1955

18,356,221.38

BALANCE AUGUST 31, 1954

ADDITIONS

Land and Buildings (Schedule 5)

Surplus (Exhibit B)

Plant Funds (Exhibit F)

Sale of 1215 New York Avenue, N. W.*

219,748.71

52,847.41

(-122,500.00)

150,096.12

Equipment (Schedule 9)

Surplus (Exhibit B)

Rationalized Current Funds (Exhibit C)

Plant Funds (Exhibit F)

Departments (Schedule 2)

79,288.15

36,59

23,982.47

92,154.94

195,442.15

Reduction of Year Notes (Schedule 4A)

Surplus (Exhibit B)

* Secured by 1215 New York Avenue, N. W.

Due to Rationalized Funds

140,034.88

76,350.00

90,384.88

37,150.00

403,078.15

18,849,294.53

DEDUCTIONS

Depreciation (Exhibit B)

Hospital (Schedules 2 and 8)

Equipment (Schedules 2 and 9)

Current Costs

Hospital

60,000.00

4,200.00

124,200.00

128,400.00

188,400.00

BALANCE AUGUST 31, 1955—EXHIBIT A

18,660,894.53

Exhibit C

SCHEDULES

CURRENT INCOME

For the Year Ended August 31, 1955

EDUCATIONAL AND GENERAL

STUDENT FEES

Tuition and Laboratory	248,131.34
Columbian	88,307.01
Education	195,146.44
Engineering	177,285.87
General Studies	12,495.00
Institute of Correctional Administration	110,410.42
Graduate	28,188.00
Air Force Advanced Management	23,331.00
Air Force Military Economic Policy	126,180.00
Air Force Manpower Management	23,380.00
Navy Coordinator	36,478.00
Graduate Council	599,977.57
Junior	317,487.15
Law	310,439.00
Medicine	14,393.47
Post-Graduate Medical Education	20,881.00
Pharmacy	161,413.99
Special Students	253,568.89
University Students	

2,747,461.15

Summer Sessions

267,171.85

Unallocated—Old Fees

1,940.86

3,016,573.85

Miscellaneous Fees

Application	29,196.00
Appellate	1,155.00
Binding Theses	540.00
Bookage	452.25
Business' Council	2,127.00
Graduation	25,625.00
Hotel	1,245.00
Library Fines	353.15
Publication of Theses	2,175.00
Reinstatement	1,255.00
Service	2,822.00
Special Examinations	285.00
Southern Bar Association	5,105.00
Testing Center	11,516.75
Transcripts	3,893.81
	<u>87,745.96</u>
	3,104,319.82

CURRENT INCOME (Continued)

For the Year Ended August 31, 1955

EDUCATIONAL AND GENERAL (Continued)

Investment Income (Schedule 10A)			
Tax-exempt (Schedule 10B - Part 1, line 10)	38,324.70	148,799.08	
" " " "	110,474.38	7,821.70	156,620.78
Paid in full - Received			
Gain:		10,255.50	
Unadjusted (Appendix - Part D)			
Paid and (Schedule 10B - Part 1, line 11)	68,620.85	80,178.55	
Received (Appendix - Part V)	1,002.00		
Student Activities - Student Council			
Athletic	62,873.49		
Caret Conference	175.00		
Caret, Film	8,795.14		
Caret, Books	681.14		
Dance	1,896.80		
Exchange Council	35.52		
Fellowship	70.55		
Hockey	6,118.21		
Honoraria	4,550.92		
Music, Dance	801.00		
Music, Dance	716.75		
Spring Outing	714.98		
Student Bar Association	79.40		
Student Council	239.35		
Student Council			87,678.75

MISCELLANEOUS

Discounts Paid	5,457.17	
Harvey Lee-Veterans Administration	13,560.85	
Law Review	4,152.77	
Michigan	1,848.80	
Miscellaneous	3,540.75	
Parking Lot-2344 I Street, NW	22,994.25	
Personal Office Confidential Service	13.00	
Photographic Laboratory	938.27	
Real Estate Office	80,017.85	
Rent on Miscellaneous Properties-Net	51,780.67	
Speech Cards	3,870.00	
Transfer from Hospital (Schedule D) for support of School of Medicine	147,099.78	
Transfer from Law Center Fund (Schedule 18) for campaign expense	17,998.06	303,262.42

ORGANIZED REVENUE (Schedule 10)

Deferred from 1953-54	335,952.87	
Income 1954-55	3,381,179.42	
Deferred to 1955-56	3,717,128.99	
	294,093.51	3,423,035.48

CURRENT INCOME (Continued)
For the Year Ended August 31, 1955

EDUCATIONAL AND GENERAL (Continued)
Hospital - Patients

Room Charges	508,082.00
Private	1,226,899.64
Semi-Private	254,041.00
Wards	127,020.00
Nursaries	2,116,042.64

Special Service Departments

Operating Rooms	211,051.70
Diagnostic Rooms	117,888.85
Anesthesiology	278,369.10
Oxygen Plant	50,446.26
X-Ray	261,224.75
Physical Medicine	76,502.25
Laboratory	455,104.50
Pharmacy	259,166.00
Catheter	84,818.65
Physician Laboratory	10,251.50
Pathology Laboratory	5,638.00
Post-Anesthesia Room	20,724.00
	1,786,660.56

<i>Cancer Clinic</i>	
<i>General Services</i>	
<i>Crits</i>	85,814.22
<i>Washington Home for Foundlings</i>	1,579.45
<i>Investment Income (Schedule D)</i>	91.99
<i>Miscellaneous</i>	1,834.26
	<hr/> 11.37
	86,851.29

<i>Out Patient Departments</i>	
<i>Charges</i>	
<i>Emergency</i>	48,780.92
<i>Optical</i>	18,521.18
<i>Urology</i>	40.70
<i>Surgery</i>	13,698.50
<i>Dental</i>	4,934.40
<i>Cytopathology - Offices</i>	483.50
	<hr/> 83,799.70

<i>Other Income</i>	
<i>Medical and Surgical Supplies</i>	156,477.31
<i>School Duty Nurses</i>	7,092.00
<i>Telephone</i>	19,799.82
	<hr/> 183,338.63
	4,262,672.82 (Continued)

CURRENT INCOME (Continued)
For the Year Ended August 31, 1955

EDUCATIONAL AND GENERAL (Continued)

Hospital Patients (Continued)	4,242,672.82
Less Allowances	
Grant Hospitalization	60,514.71
Hospital Nursing Agency	28,277.46
D.C. Hospital Department	6,429.79
Discharges	5,142.72
Free Work	108,486.92
Other	2,187.21
	<u>211,278.81</u>
Total Hospital Patients	4,051,394.01

Hospital - Other Income	98,671.10
Cafeteria	8,746.68
Insurance Income (Schedule 103)	2,600.80
Gross	2,911.92
Rent Debt Recovery	1,980.70
Laundry	1,088.00
Medical Materials	600.00
Packaging Plant	346.46
Public Telephone Concessions	2,398.22
Miscellaneous	114,572.98
	4,165,666.99

AUXILIARY ENTERPRISES

Residence Halls		
Norfolk House - Lodges Apartments	17,000.22	
Lawson and Robinson Hall	6,000.00	
Strong Hall	33,159.76	
Waller Hall	21,111.20	97,340.18
Security Halls		
2120 G Street, NW	1,350.00	
1129 G Street, NW	4,501.50	
2131 G Street, NW	778.00	
802 H St. S.W., NW	600.00	7,230.50
Miscellaneous		
Black House - University		
Black Student-Middle School	310,894.18	
College - Contributions	88,033.67	
Drum Corps - Expenses	9,750.00	
Lower Administration	467.59	
Student Union	19,432.00	
	8,012.57	402,590.01
		507,180.69
TOTAL EXHIBIT B		11,828,349.28

CURRENT EXPENSE

For the Year Ended August 31, 1953

	Total	Salaries	Other Expense	Equipment Expenditure
EDUCATIONAL AND GENERAL				
Administrative and General				
President's Office	31,034.42	26,086.31	14,428.31	
Administrative Secretary's Office	26,933.62	22,277.20	4,807.42	
Dean of Faculty's Office	31,011.86	19,011.31	42,096.48	
Treasurer's Office	311,849.99	176,787.21	35,002.78	
Admissions Office	10,227.28	46,075.01	4,283.07	
Registrar's Office	33,713.72	46,543.52	9,171.30	
Director for Men	6,532.06	3,910.18	644.48	
Admission for Women	13,034.98	12,103.91	679.07	
Admission to Graduate from Foreign Countries	1,259.74	494.22	708.08	
University Chapter	1,442.08	763.00	717.68	
Admission to Graduate	13,394.11	12,785.05	609.06	
Staff Salaries	111,511.19	14,327.80	107,111.59	
Assistant to Dean of Faculty's Office	17,665.66	15,941.63	1,724.03	
Assistant to Dean	20,012.29	14,744.07	7,268.12	
Assistant to Dean	18,545.78	11,939.43	7,606.35	
International Committee	47,982.41	21,000.80	26,981.61	
Public Relations	19,096.04	963.10	18,134.93	
General Fund	2,788.26	5,333.26	465.00	
Secretary's Office	29,100.00		29,100.00	
University	17,998.06	13,914.86	4,083.20	
University	23,177.82	849.88	23,727.94	
University	22,000.28	527,253.77	133,645.52	

Department
 Department
 Department

Department	1929-30	1930-31	1931-32	1932-33	1933-34
Art	18,864.88	12,200.00	6,114.48	1,016.98	132.11
Business	14,008.50	12,500.00	418.50	1,016.98	132.11
Chemistry	17,402.07	11,525.00	217.47	1,016.98	132.11
Classical Languages and Literature	68,000.00	61,000.00	6,000.00	1,016.98	132.11
Education	5,000.00	3,000.00	3,000.00	1,016.98	132.11
English	66,287.90	38,104.88	118.02	1,016.98	132.11
Geography	101,492.58	101,174.72	317.86	1,016.98	132.11
Government	14,820.71	14,000.00	820.71	1,016.98	132.11
History	8,814.09	6,810.00	2,004.09	1,016.98	132.11
Law	48,471.80	48,143.63	328.17	1,016.98	132.11
Mathematics	12,000.00	12,000.00	0.00	1,016.98	132.11
Philosophy	79,471.27	29,400.00	50,071.27	1,016.98	132.11
Physics	9,000.00	9,000.00	0.00	1,016.98	132.11
Political Science	12,012.91	10,119.92	1,892.99	1,016.98	132.11
Psychology	11,476.73	31,419.90	20,000.00	1,016.98	132.11
Religion	17,610.00	27,000.00	9,390.00	1,016.98	132.11
Romance Languages	16,449.72	16,000.00	449.72	1,016.98	132.11
Sciences and Social	18,000.00	18,000.00	0.00	1,016.98	132.11
Physical Education	7,114.00	6,000.00	1,114.00	1,016.98	132.11
Public Health	3,000.00	3,000.00	0.00	1,016.98	132.11
Statistics	15,114.97	15,110.00	4.97	1,016.98	132.11
Summaries	29,000.00	29,000.00	0.00	1,016.98	132.11
Unassigned	20,110.91	17,000.00	3,110.91	1,016.98	132.11
Total	631,743.61	631,674.36	69.25	1,016.98	132.11

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CURRENT EXPENSE (Continued)
For the Year Ended August 31, 1955

EDUCATIONAL AND GENERAL (Continued)

Instruction (Continued)

	TOTAL	SALARIES	OTHER EXPENSE	EQUIPMENT EXPENSE
Expenditures				
Administration	5,295.45	4,420.97	874.48	
Education	44,087.44	43,718.38	369.06	
House Tenants	12,191.83	10,800.00	1,391.81	212.02
	<u>61,574.72</u>	<u>58,939.35</u>	<u>2,541.35</u>	<u>212.02</u>

Engineering				
Administration	10,213.14	7,299.31	2,913.83	
Chemical	39,097.48	34,762.00	927.85	2,209.63
Electric	24,114.56	18,827.00	456.63	4,848.63
Mechanical	28,318.72	22,855.00	659.11	5,004.61
Engineering Administration	10,777.77	10,500.00	247.77	
Engineering Council	1,012.82		1,012.82	
Materials	3,048.80		3,048.80	
	<u>117,541.29</u>	<u>94,288.31</u>	<u>9,569.81</u>	<u>10,663.17</u>

General Studies				
Administration	53,825.48	44,215.05	9,610.45	
Instruction	65,390.53	64,714.00	174.53	
Research Council	10,263.03	19,278.65	622.65	561.75
University of Connecticut Administration	7,798.84	7,085.00	713.84	
	<u>137,277.88</u>	<u>134,392.68</u>	<u>11,123.45</u>	<u>561.75</u>

At Peace Advanced Management	4,900.41	60.12
At Peace Advanced Management	20,888.00	120.10
At Peace Advanced Management	17,000.43	3,845.88
At Peace Advanced Management	72,779.42	54,401.48
Business Administration	9,589.68	17,927.94
Business Administration	23,816.24	1,880.19
Business Administration	450.00	61.24
Business Administration	1,000.00	
Business Administration	4,688.84	1,688.84
Business Administration	1,800.00	
Business Administration	300.00	
Business Administration	15,794.15	
Business Administration	9,620.00	1,746.08
Business Administration	21,225.00	
Business Administration	204,298.44	98.50
Business Administration	173,643.00	27,531.94
Business Administration	4,752.34	771.50
Business Administration	3,542.90	1,321.50
Business Administration	8,093.44	
Business Administration	4,724.74	
Business Administration	4,079.88	644.86
Business Administration	25,171.06	
Business Administration	151,623.75	11,122.18
Business Administration	11,947.65	2,272.50
Business Administration	23,735.80	9,683.85
Business Administration	2,146.48	2,572.19
Business Administration	214,727.34	2,116.48
Business Administration	186,960.64	27,766.50

CURRENT EXPENSE (Continued)
For the Year Ended August 31, 1955

EDUCATIONAL AND GENERAL (Continued)

Institutions (Continued)

	Total	Salaries	Other Expense	Equipment Exhibit G
Medicine				
Administration	86,288.97	30,496.88	5,492.97	2,249.12
Anatomy	37,042.40	35,099.76	1,443.13	499.51
Embryology, Hygiene, Preventive Medicine	37,288.35	33,824.23	1,938.99	1,525.13
Endocrinology	36,592.38	34,529.84	2,077.84	184.70
Immunology	1,310.00	1,450.00	60.90	
Physiology, Syphilology	435.00	435.00		
Locomotor and Excretory Processes	36,472.13	33,093.70	629.43	739.00
Medicine	8,844.20	3,350.00	194.20	300.00
Neurology, Neurological Surgery	23,150.00	22,000.00	250.00	
Oncology, Gynecology	1,567.86	1,321.00	242.86	
Ophthalmology	100.00		100.00	
Otolaryngology	28,957.42	27,811.46	977.96	168.00
Pathology	14,129.14	13,819.78	309.36	
Physiology	23,396.13	24,049.80	996.48	869.85
Physiology	3,099.00	3,029.96		
Physical Medicine and Rehabilitation	37,925.05	33,773.05	1,793.78	356.22
Physiology	14,533.47	5,871.63	8,491.84	
Physiology	2,044.73	1,950.00	94.73	
Physiology	19,987.79	6,318.13	5,228.23	8,241.43
Physiology	29,345.73	28,009.76	1,045.97	
Physiology - General	6,338.27	5,400.00	938.27	
Physiology - General	1,643.56	1,475.00	150.00	
Physiology - General	335,376.92	352,744.98	30,496.94	95,132.96

Physical Education—
Instruction

2,005.83	632.54
<u>32,000.00</u>	<u>1,000.00</u>
34,751.83	1,238.61
	<u>1,000.15</u>
	<u>1,238.15</u>

Special Activities

5,127.44	5,015.06	107.48
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Library—Administration

5,471.49	4,000.00	771.57
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Support Services—Administration
Instruction

8,165.14	5,000.00	3,070.13
<u>89,313.29</u>	<u>86,023.00</u>	<u>2,888.29</u>
97,678.43	91,720.21	5,958.42

Art Science—R. O. T. C.

5,212.77	5,104.43	113.34
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Physical Education—Men
Women

59,118.91	26,365.26	6,783.65
<u>81,688.93</u>	<u>20,827.00</u>	<u>4,861.31</u>
94,807.29	53,122.26	11,613.00

Total Expenditures

2,041,887.06	1,855,527.13	173,250.45	37,807.48
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CURRENT EXPENSE (Continued)
For the Year Ended August 31, 1955

EDUCATIONAL AND GENERAL (Continued)

	Total	Salaries	Other Expense	Equipment Exhibit G
Textbooks.....	42,793.75			42,793.75
Other.....	94,959.04	92,141.12	12,761.16	47.70
	<u>137,752.79</u>	<u>92,141.12</u>	<u>12,761.16</u>	<u>42,841.45</u>

MAINTENANCE AND OPERATION OF PLANT

	580,817.22	235,232.12	329,192.02	16,393.01
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STUDENT ACTIVITIES

Deposits.....	6,849.70	3,980.92	2,868.78	
Health Administration.....	22,820.70	18,159.96	4,660.74	
Honors.....	2,066.95	94.50	1,972.45	
Men's Activities.....	230,212.68	41,556.86	197,655.82	
Recreation Program.....	2,388.87	964.00	1,424.87	
Student Activities Office.....	3,913.78	2,565.96	1,347.82	
Student Council Accounts.....	31,246.33	700.00	30,546.33	
University Accounts.....	4,859.52	2,749.92	1,809.60	
	<u>313,158.53</u>	<u>70,772.12</u>	<u>242,386.41</u>	

171,225.44 172,719.71 200,505.73

Dietary

510,117.33 225,106.07 284,921.26

Hospital and Property

Laundry

62,359.16 60,029.64 2,129.52

Laundry Services

44,738.54 14,144.99 80,947.55

Housekeeping

165,450.94 147,869.01 17,561.93

Paint

174,125.19 69,203.79 105,921.40

Professional Care - General

449,673.83 291,314.43 158,359.40

Medical and Surgical

86,923.43 73,123.33 13,800.10

Nursing Care

809,183.67 836,017.69 77,165.08

Central Postal Supply

81,899.73 24,932.76 56,967.47

Professional Care - Special

1,012,967.15 914,061.68 108,905.45

Physiotherapy

8,316.27 8,316.27

Physiotherapy - Special

146,122.84 89,025.48 57,097.36

Pharmacy

78,321.38 67,130.98 11,190.40

Pharmacy - Special

149,076.02 81,941.30 67,134.72

Physiology

31,375.71 9,840.10 21,535.61

Physiology - Special

12,071.13 10,070.28 2,000.85 (Continued)

CURRENT EXPENSE (Continued)
For the Year Ended August 31, 1955

	Total	Salaries	Other Expenses	Investment Expenditure
HOSPITAL (Continued)				
Professional Care—Special (Continued)				
Electroencephalography	5,000.40	4,687.14	322.12	
Laboratory	141,271.71	126,020.60	17,251.11	
Pharmacy	114,115.13	22,131.60	92,175.93	
Physical Medicine	47,866.34	42,782.87	1,000.07	
Radiologic Laboratory	1,000.26		2,090.28	
X-Ray	121,204.51	86,504.23	45,260.28	
Books	14,216.07	14,922.86	1,555.11	
Medical Library for Residents and Faculty	2,211.44	1,140.36	990.18	
	<u>507,416.48</u>	<u>355,192.34</u>	<u>178,633.84</u>	
College Clinic				
Administrative	12,124.50	10,135.44	12,589.12	
Medical and Surgical	1,261.76	11,115.23	27,072.43	
Pharmacy and X-Ray Services	1,439.68	305.16	1,428.12	
Laboratory	6,174.57	4,572.14	1,282.43	
Physical Medicine	11,113.03	4,323.14	7,229.89	
Books	1,000.12		1,000.12	
Medical Research Laboratory	501.75		501.75	
Overhead Costs—Depreciation	<u>17,517.41</u>		<u>(= 17,517.41)</u>	
Depreciation—Equipment (Exhibit G) (Continued 9)	<u>4,000.00</u>		<u>4,000.00</u>	
	<u>50,118.38</u>	<u>50,118.38</u>	<u>37,104.87</u>	

CLIPPING IN *THE NEW YORK TIMES*
For the Year Ended August 1, 1978

UNITARY ENTERPRISES	THRU	SALES	EXP.	1957-58
BRIDGE & HALL				
Summit Hill	42,828.40	17,998.67	28,854.61	
Walton Hill	11,551.01	4,186.09	8,364.92	
Levy and Randolph Hill	1,437.88	150.00	1,287.88	
Summit Hill	1,912.65		2,022.65	
	<u>59,729.94</u>	<u>18,304.76</u>	<u>41,427.16</u>	
SEAFORD HILLS				
3112 G Street, NW	56,817	120.00	448.17	
3129 G Street, NW	4,145.40	675.00	8,468.40	
3111 G Street, NW	512.00	100.00	412.00	
302 Thacker Street, NW	190.55		340.55	
	<u>5,545.72</u>	<u>895.00</u>	<u>4,554.72</u>	
SPRING				
Black Spring - University	315,622.77	45,185.60	268,477.17	100.00
" " Medical School	47,661.59	5,341.04	49,420.55	
University Auditions	29,249.63	11,847.45	17,602.08	
Dormitory Building	226.72		226.72	
	<u>392,000.41</u>	<u>61,874.09</u>	<u>330,026.52</u>	<u>100.00</u>
	457,282.55	81,073.85	376,208.50	100.00

STUDENT AID

Scholarships

40,344.00

40,344.00

TOTAL EXPENSE

11,683,491.97

7,306,293.00

4,287,098.13

92,134.94

Less overhead expense charged to various departments and
included in "Other Expenses" sheet

641,876.01

TOTAL EXPENSE, ADJUSTED—EXHIBIT B

11,041,615.96

Summary 2—Page 4

MISCELLANEOUS ASSETS AND LIABILITIES

August 31, 1955

Exhibit A
79,500.00

TRUST NOTE RECEIVABLE

N. Pappas & Co. - Secured by 1234 New York Avenue, NW. Due Jan 17, 1962. Interest 6%

ACCOUNTS RECEIVABLE

Optical Research, Inc.	747,339.10
Leisure and Other Food	27,487.80
Dinnering's Rest	77.14
Machobane	243.00
Student Bar Association	86.43
Financial and Technical Consulting Service	342.59
Hawaii	
Loan Payments for Deceased Associates	537,056.23
	<u>170,000.00</u>
	367,056.23
	<u>1,144,642.29</u>

MISCELLANEOUS ASSETS AND LIABILITIES (Continued)

1931, 1932

EXHIBIT A

Investments Representing Current Funds			
	%	Per	Value
		PAR	MARKET
United States of America—Certificates of Indebtedness	2	6 22 56	39,974.00
			40,000.00
	2.76	50,000	49,600.00
			50,000.00
Switzerland			89,574.00
			90,000.00

NOTRE PAYS

Rock National Bank Due November 29, 1932 Interest \$10.00

$$O(n) \cdot O(m) \cdot O(k);$$

ASSETS OF LOAN FUNDS

August 31, 1955

FUNDS

	Total	Cash	Loans Receivable
Home Improvement Loan Fund	382.35	382.35	
Kellogg Loan Fund	19,225.64	1,698.15	17,527.49
Law Association Loan Fund	853.15	181.86	671.29
Peace Loan Fund	1,001.33	301.33	700.00
Schools Loan Fund	1,900.47	1,613.47	287.00
School of Medicine Loan Fund	2,225.42	1,825.42	400.00
Seminaries Loan Fund	1,381.00	381.00	1,000.00
University Loan Fund	8,646.69	8,646.69	
War Loan Fund	4,993.37		4,993.37
TOTAL - Expense A	40,411.42	15,002.37	25,409.15

SCHEDULE 4

ASSETS OF ENDOWMENT FUNDS

August 31, 1955

CONSOLIDATED ENDOWMENT FUNDS

Bonds	Description	%	Value		
			Date	Par	Market
Adelson, Typocka and Sachs Fe Ry, Co.	General Mortgage	4	1995	2,000	2,520.00
Baltimore Gas & Electric Co., Baltimore, Md.	Refunding Mortgage A	4	1980	5,000	5,150.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	First Mortgage D	3 1/2	1982	30,000	29,700.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	First Mortgage	3 1/2	1987	30,000	29,700.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	Convertible Subordinated Deb	3	1982	15,000	18,150.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	Convertible Subordinated Deb	3 1/2	1988	75,000	74,202.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	Convertible Subordinated Deb	3 1/2	1972	40,000	36,200.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	General Mortgage D	4 1/2	1976	25,000	29,000.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	First Mortgage A	2 3/4	1981	30,000	27,800.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	Subordinate First Mortgage	4 1/2	1966	18,000	18,360.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	Subordinate First Mortgage	3 1/2	1988	25,000	24,250.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	Refunding (1st Mortgage) A	4 1/2	2013	30,000	25,200.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	General Mortgage F	4 1/2	1984	25,000	25,750.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	General Mortgage	4 1/2	1960	1,000	1,050.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	General Mortgage	3	1973	30,000	29,100.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	Subordinate First Mortgage	3 1/2	1982	25,000	25,000.00
Chesapeake & Potomac Telephone Co., Baltimore, Md.	Convertible Subordinated Deb	3 1/2	1979	5,000	5,350.00

ASSETS OF ENDOWMENT FUNDS (Continued)

August 31, 1955

CONSOLIDATED ENDOWMENT FUNDS (Continued)

STOCKS—Preferred	Description	Rate of %	Shares	Value	
				Market	Book
American Smelting and Refining Co.	Cumulative	7	120	19,920.00	17,496.70
American Vacuum Corporation	Cumulative	5	100	11,800.00	10,750.00
Armstrong Electric Power Co.	Cumulative	4½	100	10,700.00	10,000.00
Armstrong, Topinka and Santa Fe Ry. Co.	Non-cumulative	5	120	7,080.00	5,957.50
Cayland and Pittsburgh R. R. Co.	Guaranteed	7	100	7,500.00	8,500.00
Consolidated Light and Power Co.	Cumulative	\$2.20	400	21,900.00	21,008.22
Consolidated Edison Co. of New York	Cumulative	\$5.40	300	33,000.00	32,386.17
Quincy Gas Works	Cumulative	3½	240	25,520.00	24,000.00
Detroit, Huron and S. W. R. R. Co.	Guaranteed	4	166	12,877.00	10,432.00
General Motors Corporation	Cumulative	\$5.75	200	20,000.00	20,000.00
General Motors Corporation	Cumulative	\$5.00	100	12,800.00	12,521.25
General Motors Corporation	Cumulative	\$3.50	50	4,500.00	5,180.00
General Motors Corporation	Cumulative	6	100	15,000.00	11,700.00
General Motors Corporation	Cumulative	4.64	100	10,800.00	10,800.00

ASSETS OF ENDOWMENT FUNDS (Continued)

August 31, 1955

CONSOLIDATED ENDOWMENT FUNDS (Continued)

Stocks—Continued	SHARES	MARKET	Book
Alfa Chemical Manufacturing Co.	500	36,000.00	21,347.00
American Gas and Electric Co.	719	34,512.00	13,209.81
American Telephone and Telegraph Co.	246	45,831.00	38,701.17
Chrysler Corporation	220	19,140.00	12,347.75
Gold Corp.	200	27,000.00	24,254.58
Continental Gas Co.	300	14,000.00	14,215.85
Continental Oil Co.	500	28,500.00	20,161.14
Continental Rubber Co.	1,110	51,000.00	26,789.74
Continental Tires	31	2,480.00	3,371.69
Continental Tires National Rubber Tire Co. of Canada	337	34,711.00	16,929.77
Continental Tires National Rubber Tire Co. of Canada	200	19,300.00	18,683.35
Continental Tires National Rubber Tire Co. of Canada	425	36,320.00	9,454.95
Continental Tires National Rubber Tire Co. of Canada	30	12,712.00	4,907.00
Continental Tires National Rubber Tire Co. of Canada	330	26,400.00	13,126.72
Continental Tires National Rubber Tire Co. of Canada	157	1,191.00	4,179.70
Continental Tires National Rubber Tire Co. of Canada	300	15,900.00	8,400.00
Continental Tires National Rubber Tire Co. of Canada	1,319	14,153.00	35,051.99
Continental Tires National Rubber Tire Co. of Canada	200	27,400.00	16,410.77
Continental Tires National Rubber Tire Co. of Canada	300	17,000.00	12,081.18
Continental Tires National Rubber Tire Co. of Canada	300	37,300.00	18,227.30
Continental Tires National Rubber Tire Co. of Canada	1,700	50,000.00	20,471.90
Continental Tires National Rubber Tire Co. of Canada	12	1,000.00	688.00
Continental Tires National Rubber Tire Co. of Canada	600	27,000.00	18,133.51
Continental Tires National Rubber Tire Co. of Canada	100	2,100.00	2,302.18
Continental Tires National Rubber Tire Co. of Canada	400	10,000.00	8,046.84
Continental Tires National Rubber Tire Co. of Canada	333	6,900.00	6,143.75
Continental Tires National Rubber Tire Co. of Canada	600	20,400.00	20,718.77
Continental Tires National Rubber Tire Co. of Canada	300	17,000.00	14,054.67
Continental Tires National Rubber Tire Co. of Canada	400	14,800.00	14,581.20
Continental Tires National Rubber Tire Co. of Canada	400	24,000.00	7,817.25

R. J. Reynolds Tobacco Co.—New Class B
 Roca National Bank
 Southern Savings Co.
 Southern Trust Co.
 Southern California Pacific Co.
 Southern Oil Co. of California
 Telephonic Investment Co.
 Union Carbide and Carbon Corporation
 United Gas Corporation
 Wm. Wrigley Jr., Co.

100	4,800.00	5,112.50
92	40,480.00	28,376.00
6	8,710.00	8,068.50
1,681	102,663.00	28,430.16
737	37,324.00	20,573.66
75012	68,299.00	16,171.27
1,000	99,000.00	16,045.28
48	4,725.00	3,907.50
880	28,100.00	15,436.79
10	680.00	207.50
	<u>1,212,116.00</u>	<u>181,246.20</u>

TRUST NOTES RECEIVABLE

Greene, F. Co.—Issued for 100 acres of land in Putnam County, Missouri. Due \$5,954.40 each.
 December 15 next paid in full.
 K. (Mrs.) A. P.—Secured by 400 acres of land in Putnam County, Missouri. Due \$12,500 each.
 December 15 next paid in full.

4	29,772.31	29,772.31
4	80,000.00	80,000.00
	<u>8,752.31</u>	<u>10,772.31</u>

REAR PORCH—Stone Hall, 620 Elm Street, NW. Loan for 20,818.81/2, \$1444.80

	<u>203,915.00</u>	<u>203,915.00</u>
	<u>49,604.20</u>	<u>49,604.20</u>

	<u>2,872,131.77</u>	<u>2,249,400.03</u>
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ASSETS OF ENDOWMENT FUNDS (Continued)

August 31, 1955

SCOTTISH RITE FUND

Assets	Description	%	Dt.	Value	
				Market	Book
Assets					
1	American Telegraph and Telegraph Co.	23 1/2	1950	22,750.00	25,000.00
2	Federal National Mortgage Association	20 1/2	1-58	49,150.00	50,000.00
3	Livingston and Northern Railway Co.	5	1955	13,200.00	12,540.00
4	Northern Pacific Railway Co.	4	1997	26,750.00	26,641.00
5	State Lumber and Furniture Co.	3 1/2	1952	20,000.00	20,000.00
6	" " " "	8	1950	5,000.00	5,000.00
7	" " " "	4 1/2	1974	15,450.00	15,285.00
8	United States of America	2 1/2	1956-52	69,500.00	72,150.00
9	United States of America	2 1/2	2-56	291.00	1,000.00
10	United States of America	2 1/2	9-52	47,880.00	40,000.00
11	United States of America	2 1/2	1975-80	25,000.00	25,000.00
12	United States of America	2 1/2	10-52	99,000.00	100,000.00
13	United States of America	2 1/2	1-57	49,000.00	50,000.00
14	United States of America	3 1/2	1978-83	52,125.00	50,000.00
15	United States of America	5	1950	4,500.00	4,250.00
16	United States of America	4	2501	10,230.00	12,131.00
17	Washington Gas Light Co.				
18	West Shore Railroad Co.				
				<u>477,659.00</u>	<u>509,201.00</u>

STOCKS—Preferred

Company	Shares	Rate or %	Amount
American Viscose Corporation	100	5	11,800.00
Baltimore Gas and Electric Co.	130	4	13,520.00
Cellulose Corporation of America	200	4 1/2	15,312.73
General Motors Corporation	40	\$3.75	20,081.50
General Shoe Corporation	50	\$1.50	4,000.00
Great Power Co.	100	4.64	4,800.00
Hocht Co.	150	3 1/2	10,500.00
Indiana Power Co.	400	4.26	13,350.00
International Harvester Co.	50	7	20,800.00
Marionette Ward and Co.	100	\$7.00	8,000.00
Pacific Telephone and Telegraph Co.	200	6	17,000.00
Phar, Oak, and Co.	50	4	5,600.00
Philadelphia Electric Co.	100	3 1/8	10,000.00
Plymouth and Co., Ltd., Inc.	138	4	12,420.00
Prosser Electric Power Co.	300	3.6	12,900.00
R. J. Reynolds Tobacco Co.	200	3.6	17,600.00
			207,260.00
			225,180.90

[illegible]

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CONTENTS

STOCKS—Continued	SHARES	MARKET	BOOK
American Telephone and Telegraph Co.	200	39,450.00	39,801.86
Chas. & M. M. Medical Co.	500	33,000.00	18,669.10
Chas. & M. M. Medical Co.	950	43,700.00	21,064.80
Chas. & M. M. Medical Co.	1,000	86,000.00	15,725.25
Chas. & M. M. Medical Co.	1,300	63,600.00	17,210.00
Chas. & M. M. Medical Co.	400	34,500.00	11,586.21
Chas. & M. M. Medical Co.	500	16,500.00	14,502.50
Chas. & M. M. Medical Co.	300	25,500.00	15,002.50
Chas. & M. M. Medical Co.	750	61,500.00	32,577.25
Chas. & M. M. Medical Co.	300	21,500.00	20,175.15
Chas. & M. M. Medical Co.	250	5,000.00	5,345.75
Chas. & M. M. Medical Co.	150	11,850.00	10,973.94
Chas. & M. M. Medical Co.	150	62,000.00	32,625.00
Chas. & M. M. Medical Co.	211½	21,021.00	2,500.14
Chas. & M. M. Medical Co.	1,072	144,720.00	37,854.79
Chas. & M. M. Medical Co.	500	94,500.00	25,122.50
Chas. & M. M. Medical Co.	770	24,000.00	13,611.66
Chas. & M. M. Medical Co.		810,529.50	325,573.60

CASH.

Totals		1,000,000.00	1,000,000.00
Reserve for Protection of Scottish Rite Investments		58,458.64	58,458.64

SUMMARY OF ASSETS OF ENDOWMENT FUNDS

August 31, 1953

Funds	Total Assets	Cash	INVESTMENTS			
			Total	Bonds	Stocks	
					Preferred	Common
Common Fund	2,269,400.43	49,654.76	2,179,817.37	831,340.84	102,737.63	587,146.79
Southside R.R.	1,018,410.64	900.84	1,017,917.80	109,203.00	225,180.00	122,571.80
Total - Common A	1,807,923.37	50,115.10	1,237,770.17	1,000,343.84	727,918.33	900,820.49
					79,772.31	203,913.00

ENDOWMENT FUNDS HELD IN TRUST BY OTHERS

August 31, 1955

Funds	Trustees	Book Value
Andrews Scholarship Fund	American Security and Trust Co.	5,194.95
Fry Professorship Fund	National Savings and Trust Co.	106,098.48
Harvey Scholarship Fund	Washington Loan and Trust Co.	4,638.40
Sawyers Fellowship Fund	National Savings and Trust Co.	211,021.02
Sawyers Hospital Fund	Washington Home for Pioneers	29,151.03
Sharpe School of Medicine Fund	National Savings and Trust Co.	8,216.79
Spencer Scholarship Fund	Northern Trust Co.	7,422.20

Total—Exhibit A

171,712.87

CONSOLIDATED PLANT FUNDS

Bonds	Description	Ct	Dct	Value	
				PAR	MARKET
Federal Land Banks	Consolidated Farm Loan	25 1/2	8-56	50,000	49,937.00
State Loans and Finance Corporation	Subsidized Federal Farm Loan	5	1-60	10,000	10,100.00
United States of America	Government of India	11 1/2	12-55	100,000	108,523.00
"	"	2	6-56	40,000	39,974.00
"	Treasury Notes B	18 1/2	5-57	20,000	19,681.00
"	Treasury Notes	18 1/2	12-55	115,000	114,856.00
"	Savings G	21 1/2	10-55	1,000	992.00
"	Savings G	21 1/2	10-57	1,700	1,659.20
"	Savings G	21 1/2	4-61	18,000	17,763.00
"	Savings F	2 5/8	12-57	100	91.40
"	Savings K	2 7/8	11-60	50,000	29,760.00
CASH					80.10
TOTALS				455,340.00	455,386.10
				45,894.65	45,894.65
				499,234.65	501,280.75

LAW CENTER FUND

Bonds	United States of America—Treasury	2	8-56	40,000	39,912.00
CASH					24,000.00
TOTALS					63,912.00

ASSETS OF PLANT FUNDS (Continue D)

August 31, 1955

PAIRO FUND

	%	Date	Description	Value	
				Pay	Book
Bonds					
Federal Level Bonds	2.8	5-56	Consolidated Farm Loan	50,000	50,000.00
Mexico and Texas Railroad Co.	11.2	2000	First and Refunding Mortgage	6,000	4,200.00
Shawmut Pacific Co. (Oregon Loan)	4.2	1977	First Mortgage A	5,000	5,300.00
United States of America	19.8	5-57	First Mortgage B	50,000	49,205.00
	24.2	1964-69	First Mortgage C	500	475.00
	24.2	11-56	First Mortgage D	300	294.00
	2.76	9-66	First Mortgage E	200,000	198,400.00
	2.76	1-67	First Mortgage F	27,500	27,280.00
	3.4	1-78-83	First Mortgage G	1,000	1,042.00
			First Mortgage H		332,032.00
Stocks - Common					
Amalgamated Sugar and Trust Co.	220			9,500.00	8,220.00
First National City Bank of New York	68			3,900.00	2,859.00
Morgan Guaranty Trust Co.	300			15,000.00	15,860.25
Prudential Corporation	100			1,700.00	1,300.00
Rockwell International	62			27,280.00	19,543.00
Rockwell National Bank				57,840.00	47,729.21
Cash				134.39	134.39
TOTALS				\$94,114.99	\$80,895.40

SUMMARY OF ASSETS OF PLANT FUNDS

August 31, 1955

Funds	Total Assets	Cash	INVESTMENTS		
			Total	Bonds	Common Stocks
Consolidated Plant	501,280.75	45,894.65	455,386.10	455,386.10	
Law Center	45,000.00	24,965.40	40,041.50	40,041.50	
Paint	386,895.60	134.39	386,761.21	339,082.00	47,729.21
TOTAL - Exhibit A	933,185.24	70,994.44	882,188.81	834,459.60	47,729.21

LAND AND BUILDINGS

For the Year Ended August 31, 1955

Building or Location	Lot	Source	Date Acquired or Entered	Balance August 31, 1954	No. Additions	Balance August 31, 1955
Biological Sciences Building C.	Part of 844	102	1914-35	151,129.97		151,129.97
Back Street	Part of 843	79	1949	48,105.49		48,105.49
Chemistry Hall	Part of 843	79	1948	85,301.23		85,301.23
Commerce Hall (Scholarship Bldg.)	Part of 844	102	1919-24	327,481.92		327,481.92
Dinner Hall - Part of Science Bldg.	15-843	56	1953	50,000.00		50,000.00
Engineering School Building	15-843	56	1956	8,750.00		8,750.00
Engineering School Building, Sec.				94,581.28		94,581.28
Faculty Parking Lot	14-16-17-18				40,147.41	
"	19-20-25-24					
"	25-26-27-28-29					
"	300-301-302-303					
"	425-426-427-428					
"	511-513-514	56	1936	203,931.05	47,500.00	251,431.05
Gymnasium	Part of 844	102	1924-25	58,331.44		58,331.44
Hall of Constitution	Part of 841	79	1918-38	241,435.63	200.00	242,035.63
Hospital	Part of Science	54	1945	7,547,035.68	67,662.85	7,614,698.53
Law Center Building			1955		1,200.00	
Linner Auditorium	428-445-445	79	1929-31	879,976.91		879,976.91
Linner Library	Part of 954	102	1912-39	384,029.52		384,029.52

LAND AND BUILDINGS—(Continued)

For the Year Ended August 31, 1955

Buildings, Lots, &c.	Land	Structure	Year Acquired or Entered	Balance August 31, 1954	No. Acres	Balance August 31, 1955
G Street, NW—1910	C	121	1949	20,000.00	.....	20,000.00
2002	27	103	1949	33,600.00	.....	33,600.00
2004	16	103	1922	14,955.00	.....	14,955.00
2026	15	103	1929	15,074.76	.....	15,074.76
2035	Part of 824	102	1922	32,500.00	.....	32,500.00
2109	217	80	1937	19,000.00	.....	19,000.00
2108	41	80	1946	31,500.00	.....	31,500.00
2110	40	80	1949	69,479.23	.....	69,479.23
2114	815	80	1949	47,250.00	.....	47,250.00
2116	A	80	1946	20,500.00	.....	20,500.00
2118	B	80	1946	17,500.00	.....	17,500.00
2118	807	79	1943	14,000.00	.....	14,000.00
2222	25	57	1948	8,800.00	.....	8,800.00
2313, 15, 17, 19, 21.....	803-829	42	1947	23,400.00	.....	23,400.00
11 Street, NW 1899	800	119	1948	32,500.00	.....	32,500.00
1911-13	J	119	1948	67,711.70	.....	67,711.70
1921	802	119	1952	32,500.00	.....	32,500.00
1923	803	119	1949	38,000.00	.....	38,000.00

Year	Part of 834	101	1943	15,000.00	25,000.00	15,000.00
2011	806	101	1954			15,000.00
2012	810	101	1922	98,516.71		25,000.00
2013	81	101	1954	12,000.00		98,516.71
2014	82	101	1945	21,000.00		12,000.00
2015	813	101	1941	11,000.00		21,000.00
2016	814	101	1945	11,500.00		11,000.00
2017	815	101	1948	13,000.00		11,500.00
2111 (Sub-100, 8A)	817	101	1940	25,500.00		13,000.00
2113	802	77	1930	17,500.00		25,500.00
2115	804	77	1940	12,500.00		17,500.00
2118	805	77	1944	12,431.25		12,500.00
2120	808	77	1944	1,000.00		12,431.25
2127	809	77	1946	7,500.00	20,000.00	1,000.00
2131 (Sub-100, 8A)	810	77	1953	15,000.00		7,500.00
2136	811	79	1951	85,000.00		15,000.00
2142	812	77	1948	15,500.00		85,000.00
2147	813	79	1945	1,500.00		15,500.00
2150	804	55	1945	3,000.00		1,500.00
2211	16	55	1948	6,650.00		3,000.00
2213	17	55	1946	16,125.00		6,650.00
2214 17 10	18 19 808	55	1944	13,000.00		16,125.00
2300	817	42	1942	15,500.00	17,000.00	13,000.00
2308	43	42	1948	10,750.00		15,500.00
2312	814	42	1948	7,900.00		10,750.00
2316	812	42	1947	7,000.00		7,900.00
2318	811	42	1955	9,600.00	7,000.00	7,000.00

LAND AND BUILDINGS (Continued)

For the Year Ended August 31, 1958

Buildings	Lot	Square	Year Acquired	Balance 8/1/54	Net Additions	Balance August 31, 1958
1 Street, NW-2010-12	830-831	101	1945	25,000.00	18,000.00	43,000.00
" 2014	829	101	1945	25,000.00		25,000.00
" 2018	21	101	1946	50,000.00		50,000.00
" 2018	840	101	1942	16,000.00		16,000.00
" 2109	27	77	1947	11,800.00		11,800.00
" 2112	15-56	77	1947	12,500.00		12,500.00
" 2156	826	77	1948	15,000.00		15,000.00
" 2158	825	77	1945	5,000.00		5,000.00
" 2204	11	55	1949	12,000.00		12,000.00
1st Street, NW-sites	20	119	1949	30,000.00		30,000.00

20th Street, NW-780

"	702	102	1951	17,500.00	17,500.00
"	712	102	1950	36,870.03	36,870.03
"	714	102	1929	14,240.00	14,240.00
"	716	102	1950	14,500.00	14,500.00
"	718	102	1929	13,500.00	13,500.00
"	828-830	102	1929	20,000.00	20,000.00

21st Street, NW-780

"	608-609	80	1946	13,000.00	13,000.00
"	718-719	80	1915	12,500.00	12,500.00
"	714	102	1929	24,000.00	24,000.00
"	716	79	1931	40,000.00	40,000.00
"	718	79	1913	8,885.00	8,885.00
"	810	79	1919	16,422.00	16,422.00
"	812	77	1918	9,000.00	9,000.00
"	814	77	1984	21,000.00	21,000.00
"	814	77	1944	13,000.00	13,000.00

LAND AND BUILDINGS (Continued)

For the Year Ended August 31, 1955

Building Location	Lot	Source	Year Acquired or Improved	Balance Available 8/31/54	Net Addition	Balance Available 8/31/55
22-1 Street, NW 715	24	79	1939	8,190.00		8,190.00
" " 717	25	79	1940	10,143.00		10,143.00
" " 719	810	79	1952	20,000.00		20,000.00
" " 725	812-813	79	1938	8,750.00		8,750.00
" " 727	814	79	1917	4,750.00		4,750.00
" " 731	34	79	1945	7,000.00		7,000.00
" " 800-803	802-803	55	1946	18,500.00		18,500.00
" " 808	800	55	1945	9,000.00		9,000.00
" " 808	C	55	1946	14,000.00		14,000.00
" " 810	839	55	1948	18,750.00		18,750.00
" " 811	817	77	1948	10,800.00		10,800.00
" " 815-17	818	77	1948	17,000.00		17,000.00
" " 818	811	55	1952	25,000.00		25,000.00
" " 820	830	55	1945	7,000.00		7,000.00
" " 821	829	55	1947	9,250.00		9,250.00
" " 609	815	75	1946	11,000.00		11,000.00
" " 911	816	75	1950	12,000.00		12,000.00
" " 921	921	78	1948	12,500.00		12,500.00

City Street, NW—711.13

20-521

746	57	1948	13,800.00	13,800.00
716	42	1942	5,171.00	5,171.00
718	42	1944	7,421.00	7,421.00
744	42	1949	11,000.00	11,000.00
706	42	1942	4,500.00	4,500.00
608	42	1942	3,000.00	3,000.00
610	40	1949	17,790.00	17,790.00
	29	1953	16,500.00	16,500.00

24th Street, NW—717.00

— 65 —

808	42	1947	11,440.00	11,440.00
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Prospect Avenue, NW

			1,000.02 m.	
			00.00	
	12-19	1949	150,000.00	150,000.00
	842	1950	70,000.00	70,000.00
	411	1949	70,000.00	70,000.00
	500 001-840		105,000.00	105,000.00
	811	1948	50,000.00	50,000.00
		1950	50,000.00	50,000.00

Source: 11-8-1 Page 4

LAND AND BUILDINGS—(Continued)

For the Year Ended August 31, 1955

Building or Location	Lot	Square Feet	Year Acquired	Balance August 31, 1954	Net Additions	Balance August 31, 1955
New Hampshire Avenue, NW—2005 (See page 8A)	213	40	1949	9,500.00	.....	9,500.00
	818	40	1953	11,000.00	.....	11,000.00
New York Avenue, NW—1225 (See page 8A)	14-15	286	1954	122,500.00	(-122,500.00)	.....
Less Depreciation—Hospitals				17,519,928.73	150,000.12	17,670,024.85
				360,000.00	60,000.00	420,000.00
				17,159,928.73	90,000.12	

* The University has a contingent asset represented by an option to purchase from The Washington Home for Foundlings land valued at \$55,946.00 for \$1.00 plus the fair market value, less depreciation, of the portion of the Warwick Memorial Building, donated to The Washington Home for Foundlings, at the time of the exercise of such option.

TOTAL—EXHIBIT A 17,250,024.85

TRUST NOTES PAYABLE

CUMBERLAND, HENRY A. Secured by 2135 H Street, NW. Due \$100 per month including interest at 4 1/2 %.	Balance August 31, 1954	Deferrals	Balance August 31, 1955
EQUITABLE LIFE ASSURANCE SOCIETY Secured by Nations House. Due \$7.575 each May 1 and November 1 including interest at 4 %.	12,858.00	1,850.42	10,998.67
GABET, AMELIE S. Secured by 2111 H Street, NW. Due \$640 each January 12, April 12, July 12, and October 12. Interest 4 %.	100,034.71	9,175.46	157,489.25
LIBERTY NATIONAL BANK Secured by 1225 New York Avenue, NW. Due March 27, 1956. Interest 4 %.	3,000.00	3,000.00	
WASHINGTON LOAN AND TRUST CO. Secured by 2000 1st Middlebrook Building. Due February 21, 1960. Interest 4 %.	76,350.00	76,350.00	
Secured by Congress Hall and Stockton Hall. Due October 30, 1957. Interest 4 %.	350,000.00		350,000.00
	100,000.00		100,000.00
	708,842.80	90,384.88	
TOTAL—Exhibit A			618,457.92

Library Books - General

Library Books - General	250,988.06	25,893.32	276,881.41
Hospital	2,497.22		2,497.22
Law School	129,118.19	11,284.64	140,402.83
School of Medicine	37,198.77	5,898.59	43,097.36
Lutheran Association	94,844.28		94,844.28
Lutheran Church	43,898.06	547.70	44,445.76
Misses' Union	4,332.01		4,332.01
Nurses' Home	6,730.00		6,730.00
Seaside Hall	18,000.00		18,000.00
Seaside Union	9,496.00		9,496.00
Welling Hall	80,000.44		80,000.44
	<u>2,037,988.47</u>	<u>195,442.11</u>	<u>2,233,430.58</u>

Long Department Catalog Check Department
 Department of Equipment

Long Department Catalog Check Department	673,000.00	4,300.00	677,300.00
Department of Equipment	671,400.00	120,000.00	791,400.00
	<u>671,400.00</u>	<u>120,000.00</u>	<u>791,400.00</u>
	1,344,400.00	67,000.00	1,411,400.00

TOTALS

Subtotal V

City	Year	Population	Area	Population per Acre	Population per Square Mile
London	1851	1,013,012	361	2,806	7,283
Paris	1856	1,053,000	251	4,195	10,845
Vienna	1850	513,000	125	4,096	10,590
Berlin	1858	413,000	100	4,130	10,675
Moscow	1858	250,000	60	4,167	10,744
St. Petersburg	1858	240,000	58	4,138	10,675
Warsaw	1858	190,000	47	4,043	10,407
Prague	1850	170,000	41	4,146	10,696
Amsterdam	1850	160,000	39	4,103	10,598
Brussels	1850	150,000	36	4,167	10,744
Antwerp	1850	140,000	34	4,118	10,648
Geneva	1850	130,000	32	4,063	10,464
Lyon	1850	120,000	30	4,000	10,261
Milan	1850	110,000	28	3,929	10,095
Rome	1850	100,000	26	3,846	9,890
Naples	1850	90,000	24	3,750	9,645
Barcelona	1850	80,000	22	3,636	9,398
Valencia	1850	70,000	20	3,500	9,000
Seville	1850	60,000	18	3,333	8,571
Madrid	1850	50,000	16	3,125	8,000
Porto	1850	40,000	14	2,857	7,317
Lisbon	1850	30,000	12	2,500	6,452
Oporto	1850	20,000	10	2,000	5,168
Coimbra	1850	10,000	5	2,000	5,168
Evora	1850	8,000	4	2,000	5,168
Beja	1850	6,000	3	2,000	5,168
Faro	1850	5,000	2	2,500	6,452
Setúbal	1850	4,000	2	2,000	5,168
Algarve	1850	3,000	1	3,000	7,744
Alentejo	1850	2,000	1	2,000	5,168
Beira	1850	1,000	1	1,000	2,584
Trás-os-Montes	1850	1,000	1	1,000	2,584
Algarve	1850	1,000	1	1,000	2,584
Alentejo	1850	1,000	1	1,000	2,584
Beira	1850	1,000	1	1,000	2,584
Trás-os-Montes	1850	1,000	1	1,000	2,584
Algarve	1850	1,000	1	1,000	2,584
Alentejo	1850	1,000	1	1,000	2,584
Beira	1850	1,000	1	1,000	2,584
Trás-os-Montes	1850	1,000	1	1,000	2,584
Algarve	1850	1,000	1	1,000	2,584
Alentejo	1850	1,000	1	1,000	2,584
Beira	1850	1,000	1	1,000	2,584
Trás-os-Montes	1850	1,000	1	1,000	2,584
Algarve	1850	1,000	1	1,000	2,584
Alentejo	1850	1,000	1	1,000	2,584
Beira	1850	1,000	1	1,000	2,584
Trás-os-Montes	1850	1,000	1	1,000	2,584
Algarve	1850	1,000	1	1,000	2,584
Alentejo	1850	1,000	1	1,000	2,584
Beira	1850	1,000	1	1,000	2,584
Trás-os-Montes	1850	1,000	1	1,000	2,584
Algarve	1850	1,000	1	1,000	2,584
Alentejo	1850	1,000	1	1,000	2,584
Beira	1850	1,000	1	1,000	2,584
Trás-os-Montes	1850	1,000	1	1,000	2,584
Algarve	1850	1,000	1	1,000	2,584
Alentejo	1850	1,000	1	1,000	2,584
Beira	1850	1,000	1	1,000	2,584
Trás-os-Montes	1850	1,000	1	1,000	2,584

10^3 cm^{-1}	10^3 cm^{-1}	10^3 cm^{-1}	10^3 cm^{-1}	10^3 cm^{-1}	10^3 cm^{-1}	10^3 cm^{-1}
2000-1800	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
1700-1600	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
1500-1400	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
1300-1200	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
1100-1000	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
900-800	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
700-600	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
500-400	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
300-200	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
100-50	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
50-20	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
20-10	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
10-5	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
5-2	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
2-1	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
1-0.5	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.5-0.2	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.2-0.1	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.1-0.05	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.05-0.02	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.02-0.01	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.01-0.005	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.005-0.002	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.002-0.001	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.001-0.0005	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.0005-0.0002	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.0002-0.0001	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.0001-0.00005	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.00005-0.00002	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.00002-0.00001	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.00001-0.000005	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.000005-0.000002	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.000002-0.000001	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.000001-0.0000005	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.0000005-0.0000002	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.0000002-0.0000001	1410-1370	1140-1110	1000-970	800-770	600-570	440-410
0.0000001-0.00000005	1410-1370	1140-1110	1000-970	800-770	600-570	440-4

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RESTATEMENT OF INVESTMENT INCOME
For the Year Ended April 15, 1955

FUND	Balance August 31, 1954	Net Income	Disbursements		Balance August 31, 1955
			Current Operations	Added or Forwarded	
EQUIPMENT FUNDS (continued)					
Administration					
Admission		11.00	11.00		
Alumni		26.00	26.00		
Bazaar		4.00	4.00		
Canteen		9,394.00	9,394.00		
Cemetery		10,979.75	10,979.75		
Dorm		2,073.00	2,073.00		
Dormitory		188.00	188.00		
Dormitory		1,674.50	1,674.50		
Dormitory		20.00	20.00		
Dormitory		947.34	947.34		
Dormitory		20.00	20.00		
Dormitory		747.30	747.30		
Dormitory		7.00	7.00		
Dormitory		131.00	131.00		
Dormitory		240.00	240.00		
Dormitory		424.00	424.00		
Dormitory		71.00	71.00		
Dormitory		6,024.00	6,024.00		
Dormitory		78.00	78.00		
Dormitory		4.00	4.00		
Dormitory		400.00	400.00		
Dormitory		1,131.00	1,131.00		
Dormitory		2,401.00	2,401.00		
Dormitory		10,000.00	10,000.00		

Product	Year	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39	2039-40	2040-41	2041-42	2042-43	2043-44	2044-45	2045-46	2046-47	2047-48	2048-49	2049-50	2050-51	2051-52	2052-53	2053-54	2054-55	2055-56	2056-57	2057-58	2058-59	2059-60	2060-61	2061-62	2062-63	2063-64	2064-65	2065-66	2066-67	2067-68	2068-69	2069-70	2070-71	2071-72	2072-73	2073-74	2074-75	2075-76	2076-77	2077-78	2078-79	2079-80	2080-81	2081-82	2082-83	2083-84	2084-85	2085-86	2086-87	2087-88	2088-89	2089-90	2090-91	2091-92	2092-93	2093-94	2094-95	2095-96	2096-97	2097-98	2098-99	2099-00	2100-01	2101-02	2102-03	2103-04	2104-05	2105-06	2106-07	2107-08	2108-09	2109-10	2110-11	2111-12	2112-13	2113-14	2114-15	2115-16	2116-17	2117-18	2118-19	2119-20	2120-21	2121-22	2122-23	2123-24	2124-25	2125-26	2126-27	2127-28	2128-29	2129-30	2130-31	2131-32	2132-33	2133-34	2134-35	2135-36	2136-37	2137-38	2138-39	2139-40	2140-41	2141-42	2142-43	2143-44	2144-45	2145-46	2146-47	2147-48	2148-49	2149-50	2150-51	2151-52	2152-53	2153-54	2154-55	2155-56	2156-57	2157-58	2158-59	2159-60	2160-61	2161-62	2162-63	2163-64	2164-65	2165-66	2166-67	2167-68	2168-69	2169-70	2170-71	2171-72	2172-73	2173-74	2174-75	2175-76	2176-77	2177-78	2178-79	2179-80	2180-81	2181-82	2182-83	2183-84	2184-85	2185-86	2186-87	2187-88	2188-89	2189-90	2190-91	2191-92	2192-93	2193-94	2194-95	2195-96	2196-97	2197-98	2198-99	2199-00	2200-01	2201-02	2202-03	2203-04	2204-05	2205-06	2206-07	2207-08	2208-09	2209-10	2210-11	2211-12	2212-13	2213-14	2214-15	2215-16	2216-17	2217-18	2218-19	2219-20	2220-21	2221-22	2222-23	2223-24	2224-25	2225-26	2226-27	2227-28	2228-29	2229-30	2230-31	2231-32	2232-33	2233-34	2234-35	2235-36	2236-37	2237-38	2238-39	2239-40	2240-41	2241-42	2242-43	2243-44	2244-45	2245-46	2246-47	2247-48	2248-49	2249-50	2250-51	2251-52	2252-53	2253-54	2254-55	2255-56	2256-57	2257-58	2258-59	2259-60	2260-61	2261-62	2262-63	2263-64	2264-65	2265-66	2266-67	2267-68	2268-69	2269-70	2270-71	2271-72	2272-73	2273-74	2274-75	2275-76	2276-77	2277-78	2278-79	2279-80	2280-81	2281-82	2282-83	2283-84	2284-85	2285-86	2286-87	2287-88	2288-89	2289-90	2290-91	2291-92	2292-93	2293-94	2294-95	2295-96	2296-97	2297-98	2298-99	2299-00	2300-01	2301-02	2302-03	2303-04	2304-05	2305-06	2306-07	2307-08	2308-09	2309-10	2310-11	2311-12	2312-13	2313-14	2314-15	2315-16	2316-17	2317-18	2318-19	2319-20	2320-21	2321-22	2322-23	2323-24	2324-25	2325-26	2326-27	2327-28	2328-29	2329-30	2330-31	2331-32	2332-33	2333-34	2334-35	2335-36	2336-37	2337-38	2338-39	2339-40	2340-41	2341-42	2342-43	2343-44	2344-45	2345-46	2346-47	2347-48	2348-49	2349-50	2350-51	2351-52	2352-53	2353-54	2354-55	2355-56	2356-57	2357-58	2358-59	2359-60	2360-61	2361-62	2362-63	2363-64	2364-65	2365-66	2366-67	2367-68	2368-69	2369-70	2370-71	2371-72	2372-73	2373-74	2374-75	2375-76	2376-77	2377-78	2378-79	2379-80	2380-81	2381-82	2382-83	2383-84	2384-85	2385-86	2386-87	2387-88	2388-89	2389-90	2390-91	2391-92	2392-93	2393-94	2394-95	2395-96	2396-97	2397-98	2398-99	2399-00	2400-01	2401-02	2402-03	2403-04	2404-05	2405-06	2406-07	2407-08	2408-09	2409-10	2410-11	2411-12	2412-13	2413-14	2414-15	2415-16	2416-17	2417-18	2418-19	2419-20	2420-21	2421-22	2422-23	2423-24	2424-25	2425-26	2426-27	2427-28	2428-29	2429-30	2430-31	2431-32	2432-33	2433-34	2434-35	2435-36	2436-37	2437-38	2438-39	2439-40	2440-41	2441-42	2442-43	2443-44	2444-45	2445-46	2446-47	2447-48	2448-49	2449-50	2450-51	2451-52	2452-53	2453-54	2454-55	2455-56	2456-57	2457-58	2458-59	2459-60	2460-61	2461-62	2462-63	2463-64	2464-65	2465-66	2466-67	2467-68	2468-69	2469-70	2470-71	2471-72	2472-73	2473-74	2474-75	2475-76	2476-77	2477-78	2478-79	2479-80	2480-81	2481-82	2482-83	2483-84	2484-85	2485-86	2486-87	2487-88	2488-89	2489-90	2490-91	2491-92	2492-93	2493-94	2494-95	2495-96	2496-97	2497-98	2498-99	2499-00	2500-01	2501-02	2502-03	2503-04	2504-05	2505-06	2506-07	2507-08	2508-09	2509-10	2510-11	2511-12	2512-13	2513-14	2514-15	2515-16	2516-17	2517-18	2518-19	2519-20	2520-21	2521-22	2522-23	2523-24	2524-25	2525-26	2526-27	2527-28	2528-29	2529-30	2530-31	2531-32	2532-33	2533-34	2534-35	2535-36	2536-37	2537-38	2538-39	2539-40	2540-41	2541-42	2542-43	2543-44	2544-45	2545-46	2546-47	2547-48	2548-49	2549-50	2550-51	2551-52	2552-53	2553-54	2554-55	2555-56	2556-57	2557-58	2558-59	2559-60	2560-61	2561-62	2562-63	2563-64	2564-65	2565-66	2566-67	2567-68	2568-69	2569-70	2570-71	2571-72	2572-73	2573-74	2574-75	2575-76	2576-77	2577-78	2578-79	2579-80	2580-81	2581-82	2582-83	2583-84	2584-85	2585-86	2586-87	2587-88	2588-89	2589-90	2590-91	2591-92	2592-93	2593-94	2594-95	2595-96	2596-97	2597-98	2598-99	2599-00	2600-01	2601-02	2602-03	2603-04	2604-05	2605-06	2606-07	2607-08	2608-09	2609-10	2610-11	2611-12	2612-13	2613-14	2614-15	2615-16	2616-17	2617-18	2618-19	2619-20	2620-21	2621-22	2622-23	2623-24	2624-25	2625-26	2626-27	2627-28	2628-29	2629-30	2630-31	2631-32	2632-33	2633-34	2634-35	2635-36	2636-37	2637-38	2638-39	2639-40	2640-41	2641-42	2642-43	2643-44	2644-45	2645-46	2646-47	2647-48	2648-49	2649-50	2650-51	2651-52	2652-53	2653-54	2654-55	2655-56	2656-57	2657-58	2658-59	2659-60	2660-61	2661-62	2662-63	2663-64	2664-65	2665-66	2666-67	2667-68	2668-69	2669-70	2670-71	2671-72	2672-73	2673-74	2674-75	2675-76	2676-77	2677-78	2678-79	2679-80	2680-81	2681-82	2682-83	2683-84	2684-85	2685-86	2686-87	2687-88	2688-89	2689-90	2690-91	2691-92	2692-93	2693-94	2694-95	2695-96	2696-97	2697-98	2698-99	2699-00	2700-01	2701-02	2702-03	2703-04	2704-05	2705-06	2706-07	2707-08	2708-09	2709-10	2710-11	2711-12	2712-13	2713-14	2714-15	2715-16	2716-17	2717-18	2718-19	2719-20	2720-21	2721-22	2722-23	2723-24	2724-25	2725-26	2726-27	2727-28	2728-29	2729-30	2730-31	2731-32	2732-33	2733-34	2734-35	2735-36	2736-37	2737-38	2738-39	2739-40	2740-41	2741-42	2742-43	2743-44	2744-45	2745-46	2746-47	2747-48	2748-49	2749-50	2750-51	2751-52	2752-53	2753-54	2754-55	2755-56	2756-57	2757-58	2758-59	2759-60	2760-61	2761-62	2762-63	2763-64	2764-65	2765-66	2766-67	2767-68	2768-69	2769-70	2770-71	2771-72	2772-73	2773-74	2774-75	2775-76	2776-77	2777-78	2778-79	2779-80	2780-81	2781-82	2782-83	2783-84	2784-85	2785-86	2786-87	2787-88	2788-89	2789-90	2790-91	2791-92	2792-93	2793-94	2794-95	2795-96	2796-97	2797-98	2798-99	2799-00	2800-01	2801-02	2802-03	2803-04	2804-05	2805-06	2806-07	2807-08	2808-09	2809-10	2810-11	2811-12	2812-13	2813-14	2814-15	2815-16	2816-17	2817-18	2818-19	2819-20	2820-21	2821-22	2822-23	2823-24	2824-25	2825-26	2826-27	2827-28	2828-29	2829-30	2830-31	2831-32	2832-33	2833-34	2834-35	2835-36	2836-37	2837-38	2838-39	2839-40	2840-41	2841-42	2842-43	2843-44	2844-45	2845-46	2846-47	2847-48	2848-49	2849-50	2850-51	2851-52	2852-53	2853-54	2854-55	2855-56	2856-57	2857-58	2858-59	2859-60	2860-61	2861-62	2862-63	2863-64	2864-65	2865-66	2866-67	2867-68	2868-69	2869-70	2870-71	2871-72	2872-73	2873-74	2874-75	2875-76	2876-77	2877-78	2878-79	2879-80	2880-81	2881-82	2882-83	2883-84	2884-85	2885-86	2886-87	2887-88	2888-89	2889-90	2890-91	2891-92	2892-93	2893-94	2894-95	2895-96	2896-97	2897-98	2898-99	2899-00	2900-01	2901-02	2902-03	2903-04	2904-05	2905-06	2906-07	2907-08	2908-09	2909-10	2910-11	2911-12	2912-13	2913-14	2914-15	2915-16	2916-17	2917-18	2918-19	2919-20	2920-21	2921-2
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[illegible]

For Your Future

[illegible]

RESTRICTED CURRENT FUNDS-AGENCY

For the Year Ended August 31, 1955

Funds	Balance August 31, 1954	Deposits	Withdrawals	Balance August 31, 1955
Flowers	91.85		5.00	86.85
Long Glen Nym	600.00		600.00	
National University Docket		100.00		100.00
R.O.F.C.	67.75	72.12	62.02	77.85
Women's Board of the Hospital Women's Board Control	525.82	6,940.00	6,947.06	518.76
Women's Board Gifts Shop Transferred to Schedule 12-Women's Board Hospital Fund	8,564.92	28,497.18	22,514.02	9,548.08
Women's Board Memorial Fund		175.00		175.00
TOTALS-EXHIBIT C	9,850.34	35,784.30	35,128.10	10,506.54

CHANGES IN PRINCIPAL OF LOAN FUNDS

For the Year Ended August 31, 1955

Funds	Balance August 31, 1954	Additions		Deductions	Balance August 31, 1955
		Grants	Interest on Loans	Charged Off	
D C-D A B	90 40			90 40	182 35
Home Fundraising	182 35				19,225 64
Religion	18,899 82		825 82		853 15
Law Association	813 15				1,001 33
Schools	1,000 00		1 33		1,000 47
School of Medicine	1,007 00	832 84	63		2,225 42
Social Work	1,227 42	998 00			1,381 00
University	1,300 00		21 00		8,646 69
War	8,486 28		160 41		4,095 37
	4,095 37				
Totals - Summary D	58,361 79	1,830 84	509 19	90 40	40,611 42

100

CHANGES IN PRINCIPAL OF ENDOWMENT FUNDS CONTINUED

For the Year Ended August 31, 1975

FUND	Balance August 31, 1974	Additions			Deductions	Balance August 31, 1975
		Gifts	Investments Income	Other		
RESTRICTED (Continued)						
Low Income—Africa	1,000.00					1,000.00
Summit of Exportative—Hawaii Staging	3,020.00	200.00				3,220.00
Summit of Government—Raukai Staging	279,705.00					279,705.00
Summit of Government—Raukai Staging	1,000,000.00					1,000,000.00
Summit of Maritime Boswell Dymally Funding of Hawaii Scholarship Fund	3,120.42		115.00			3,235.42
Boswell	1,700.00					1,700.00
Collier	2,420.00					2,420.00
Compton	10,000.00					10,000.00
Compton		11,000.00				11,000.00
Compton	1,000.00					1,000.00
Compton	4,400.00					4,400.00
Low	12,100.00					12,100.00
Ruby	57,400.00					57,400.00
School of Maritime Studies	11,111.00	100.00				11,211.00
School of Maritime Studies	8,115.75	1.00				8,116.75
Summit of Maritime Studies	10,000.00					10,000.00

CHANGES IN PRINCIPAL OF ENDOWMENT FUNDS RECEIVED

THE UNIVERSITY OF CHICAGO

Folio	Particulars	Particulars Amount U. 1954	Additions		Deductions	Balance Amount U. 1955
			Grants	Expenditure		
	Subscriptions					
	Amateur	8,194.00				8,194.00
	Harvard	20,000.00				20,000.00
	Beaumont		1,775.17	1.43		2,776.60
	Care	15,000.00				15,000.00
	George H. H.	2,000.00				2,000.00
	Chapin, M. M.	1,000.00				1,000.00
	Gifts of Natural History					
	Boston	1,200.00				1,200.00
	Cambridge	2,100.00				2,100.00
	Central Academy	500.00				500.00
	Fieldiana of Connecticut Women	1,000.00				1,000.00
	Hawaii	1,000.00				1,000.00
	Florida	1,000.00				1,000.00
	M. A. M. M.	1,000.00				1,000.00
	Manila	1,000.00				1,000.00

CHANGES IN PRINCIPAL OF ENDOWMENT FUNDS (Continued)

For the Year Ended August 31, 1955

Funds	Balance August 31, 1954	Additions			Deductions	Balance August 31, 1955
		Gifts	Investment Income	Other		
RESTRICTED (Continued)						
Paul	1,000.00					1,000.00
Bazzy	3,000.00					3,000.00
Cooley	1,000.00					1,000.00
Connelley	1,000.00					1,000.00
Crozier	1,000.00					1,000.00
Davis	700.00					700.00
Evans	1,000.00					1,000.00
Evans	1,417.00		45.30			1,462.30
Frost	1,000.00					1,000.00
Frost	5,119.80					5,119.80
Gallagher	1,000.00					1,000.00
Hartman	1,000.00					1,000.00
Lester	100.00					100.00
Meyer	1,000.00					1,000.00
O'Connor	5,000.00					5,000.00
Ruggles	500.00					500.00
Staughton, Elson	500.00					500.00
Sterrett	1,000.00					1,000.00
Swisher	1,000.00					1,000.00
Walsh	1,000.00					1,000.00
Weddell	5,000.00					5,000.00

PLANT

Graduate

National University Library—newer

Scholar National University Library

RESERVE FOR PROTECTION OF INVESTMENTS

Consolidated Endowment Funds

Gain on sale of investments

Seaside Rite Fund

Net gain on sale of investments

TOTALS—EXHIBIT F

14,811.00	105.00				14,916.00
1,500.00	18.75	1.25			16,365.43
3,381,198.85	116,586.88	2,712.40	21,702.35	1.00	3,524,199.57
87,928.02					
56,944.76			9,051.01		96,979.93
			1,513.68		58,458.64
3,526,072.63	116,586.88	2,712.40	34,267.24	1.00	3,679,638.14

GIFTS AND GRANTS
For the Year Ended August 31, 1958

CURRENT FUNDS		
Unrestricted—Schedule I		
Ford Motor Co.		500.00
National Radio Institute		500.00
Radiol Corporation—America		200.00
Sealed Air Co.		2,000.00
Time, Inc.		501.00
United States Steel Foundation		2,000.00
Washington Educational Foundation		1,000.00
General Atomic Association		5,104.50
		<u>10,255.50</u>
RESTRICTED—GENERAL—SCHEDULE I		
Law School—Ford Law Institute	1,000.00	
School of Engineering—Western Washington	2.00	1,002.00
RESTRICTED—HOSPITAL—SCHEDULE I		
General Clinic—various donors	1,579.45	4,180.35
Orchestra—various donors	2,000.00	
		<u>3,581,176.42</u>
RESTRICTED—ORGANIZED RESEARCH—SCHEDULE I—various donors		
RESTRICTED—SCHEDULE I—B		
Seismology, Volcanology, and Earthquake Engineering—California Institute of Technology	9,042.06	
Cardiology Institute—University of Michigan—Ann Arbor	13,108.00	
Law School—Peters, Hildebrandt and Associates—Portland, Ore.	15,120.00	
School of Medicine—University of Washington—Seattle	2,304.00	
University of California—San Diego—La Jolla	441.00	
University of California—San Diego—La Jolla	19,025.24	
University of California—San Diego—La Jolla	347.99	
University of California—San Diego—La Jolla	170.44	
University of California—San Diego—La Jolla	2,000.00	
University of California—San Diego—La Jolla	5.00	
University of California—San Diego—La Jolla	150.00	
University of California—San Diego—La Jolla	50.00	
University of California—San Diego—La Jolla	3,610.47	
University of California—San Diego—La Jolla	100.00	

[illegible]

FORMAL

3,75,227.15

DESCRIPTION OF LOAN FUNDS

August 31, 1955

<i>Huay Tschungh Loay Fong</i> —Created in 1940 by the D. C. House of Commerce Association to be loaned to visiting merchants in China.	382.38
<i>Kaituma Loay Fong</i> —Created in 1942 by the W. K. Kellogg Foundation to be loaned to students of the School of Medicine.	19,225.64
<i>Law Association Loay Fong</i> —Created in 1941 by the George Washington Law Association to be loaned to students of the Law School.	853.45
<i>Pratt Loay Fong</i> —Created in 1953 by Chas. Pratt and Co., Inc., to be loaned to students of the School of Medicine.	1,001.35
<i>Seow Chuan Loay Fong</i> —Created in 1933 by various donors (at request) to the Chinese School of Medicine, to be loaned to students in the School of Pharmacy.	1,580.47
<i>Sung Hui Loay Fong</i> —Created in 1912 by School of Medicine students to be loaned to students of the School of Medicine.	2,225.42
<i>Sung Hui Loay Fong</i> —Created in 1941 by Hsin Y. Seng and other donors, to be loaned to students of the School of Medicine.	1,381.00
<i>University Loay Fong</i> —Created in 1915 by the University to make short term loans for educational purposes.	8,646.79
<i>War Loay Fong</i> —Created in 1943 by the United States Government to be loaned to students in technical and professional fields of medical science.	4,995.37

DESCRIPTION OF ENDOWMENT FUNDS

August 31, 1968

UNRESTRICTED FUNDS

Active Fund—Bequest of George N. Aiken, M. D., received in 1924, the income to be used as required.	300.00
Alumni Endowment Fund—Granted by the Class of 1929 to be added to by succeeding graduates, the income to be used as required.	752.00
Board Fund—Granted in 1933 by James H. H. Brown, not income to be used as required.	250.00
Classroom Fund—Granted in 1923 by William W. Brown, the income to be used as required.	180,750.00
Classroom Fund—Gift of William W. Brown and other donors (1971-80), the income to be used as required.	220,150.00
Dean's Fund—Bequest of Harry C. Davis received in 1940, the income to be used as required.	41,371.00
Dean's Fund—Granted in 1953 by Dr. William C. Davis in memory of his wife, Clara S. Davis, the income to be used as required.	2,000.00
Dean's Fund—Bequest of Frederick J. Gaudin, received in 1942, the income to be used as required.	17,002.00
Dean's Fund—Granted in 1941 by William Brown, the income to be used as required.	1,000.00
John W. B. Fund—Granted in 1941 by William B. B. in memory of his wife, the income to be used as required.	19,210.00
John W. B. Fund—Bequest of George B. B. in 1941, the income to be used as required.	1,000.00
William B. B. Fund—Bequest of William B. B. in 1941, the income to be used as required.	15,000.00

<i>RIVER RACES FUND</i> —Granted in 1938 by the River Races Foundation, the amount to be used as required.	1,000.00
<i>SANDERS FUND</i> —Granted by J. Sanders in 1945, the income to be used as required.	2,110.00
<i>SCHUBERT FUND</i> —Bequest of John Marland Schubert, received in 1951, the income to be used as required. (Formerly called the <i>Princeton Fellowship Fund</i> .)	3,000.00
<i>SEARS FUND</i> —Bequest of Samuel Sears in 1891, the income to be used as required.	12,326.00
<i>TILLMAN FUND</i> —Granted in 1949 by bequest of John D. Tillman and added to by Mary L. Tillan, the income to be used as required.	1,500.00
<i>TOWERS FUND</i> —Granted by the Board of Trustees of the University in 1911, the income to be used as required.	16,978.00
<i>WATSON FUND</i> —Granted in 1954 by John E. Watson, the income to be used as required.	1,565.00
<i>WILLIAMS FUND</i> —Granted in 1948 by bequest of Alexander W. Willard and Virginia Chase Willard, the income to be used as required.	100.00
<i>WILLIAMS ALUMNI FUND</i> —Gift of the Willard Association in 1909, the income to be used as required.	16,000.00
<i>WILLIAMS FUND</i> —Gift of John Willard and other donors during the years 1811 to the income to be used as required. (Formerly called the <i>George Thompson Fellowship Fellowship Fund</i> .)	1,000.00
<i>WILLIAMS FUND</i> —Bequest of Margaret Willard Willard in 1949, the income to be used as required.	26,892.00
	50,000.00

DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1955

FELLOWSHIP FUNDS

KING FELLOWSHIP FUND—Created in 1928 by bequest of Isabella Ockers King; the income to be used for a fellowship in biology	75,322.00
MURPHY FELLOWSHIP FUND—Bequest of Robert M. Murphy, received in 1954; the income to be used for fellowships in medicine for the study of cardiovascular disease	55,303.00
SANDERS FELLOWSHIP FUND—Bequest of Adlai Sanders in 1928 in memory of her brother, Thomas Bradford Sanders; the income to be used for fellowships in various academic fields of study	211,021.02

PROFESSORSHIP FUNDS

ALFORD PROFESSORSHIP FUND—Gift of various alumni since 1911; the income to be used for an alumni professorship in mathematics	\$50.00
CARRILL PROFESSORSHIP FUND—Created by Mary A. Scripps in 1928 in memory of Maxwell Carrill; the income to be used for a chair in archaeology	500.00
CONGRESSIONAL PROFESSORSHIP FUND—Created in 1832 by gift of the United States of America by Act of Congress; the income to be used for professorships	158,710.00
DUNN COWLEY IN PUBLIC SQUARE FUND—Created by Mrs. Dunn in 1936; the income to be used for a lecture to be known as the "Cowley M. Dunn Lecture in Public Square"	170,592.00
EATON PROFESSORSHIP FUND—Bequest of Robert Eaton of Exeter, England, in 1872; the income to be used for a professorship to be called the "Eaton Professorship of Moral and Mental Philosophy"	14,519.00
FAY PROFESSORSHIP FUND—Bequest of Archibald Fay in 1945; the income of her husband, Dr. Henry D. Fay; the income to be used for a professorship in psychology	100,008.48
Created in 1945 from income of the original fund; the income of the two funds to be used for a professorship in physiology	37,509.93
YALOW FUND—Bequest of Nancy Yalow Nativ in 1929 in memory of her mother, Nancy Yalow; the income to be used for research in Yalow's laboratory	5,000.00

ENGINEERING

HOWARD LECTURE FUND—Created in 1953 by Frank A. Howard, the income to be used for lectures on engineering	\$3,620.00
STRANG FUND—Bequest of Harry L. Strang, received in 1954, the income to be used for the School of Engineering	500.00

GOVERNMENT

RANKIN FUND—Bequest of John O. Rankin, received in 1951, the income to be used for the School of Government	274,705.00
SOUTHERN ROPS FUND—Granted in 1928 by the Supreme Council of the Ancient and Accepted Scottish Rite of Freemasonry of the Southern Jurisdiction of the United States of America, the income to be used in maintaining a School of Government	1,000,000.00

LAW

ALVING FUND—Gift of Barbara F. M. Alving in 1954, in memory of P. J. Alving, the income to be used for the Law School	1,000.00
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MEDICAL

BARRY DUNN RESIDUAL FUND—Granted in 1953 by Dr. Anna Baruch Dunn from income of the Baruch Scholarship Fund, the income to be used for research in medicine	\$3,647.42
BURDEN MEDICAL FUND—Granted in 1936 by Dr. David L. Burden and Joseph Ella Burden, in memory of William C. Burden, the income to be used for the School of Medicine	\$3,707.00
COLUMBIA MEMORIAL RESIDUAL FUND—Granted in 1946 by various donors in memory of Dr. James David Collins, the income to be used for clinical research in surgery	2,828.00
GEORGE MORTIMER RESIDUAL FUND—Bequest of George J. Cooper in 1905, the income to be used by the Supreme Council of D. C. of Columbia the income to be used for the maintenance and improvement of equipment with the Medical Department of the University of a Research Laboratory, the study of the laboratory to be devoted to the investigation of the nature, causation, prevention, and cure of malaria and other infectious and contagious diseases	10,000.00

DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1953

SCHOOL FUNDS (Continued)

CHURCH FUND—Bequest of Julia M. Cummings in 1911 to memory of Charles Cummings, the income to be used for church and cemetery in connection with and under direction.	10,000.00
FRANK MERRILL SPURGE FUND—Bequest of Mary V. Purdy in 1911, the income to be used for money furnished by the School of Medicine.	1,000.00
GRANTING MORTIMER SPURGE FUND—Bequest of William D. Granting in 1905, the income to be used for the School of Medicine.	4,487.00
LEWIS MORTIMER SPURGE FUND—Bequest of Samuel F. Lewis in 1911, the income to be used for the School of Medicine.	12,270.00
ROBERT MORTIMER SPURGE FUND—Bequest of Dr. Robert Mortimer in 1911, the income to be used for the School of Medicine.	57,487.00
SCHOOL OF MEDICINE FUND—Created in 1940 by various donors, the income to be used for the School of Medicine.	12,162.00
SCHOOL OF MEDICINE CLINIC FUND—Created in 1914 by gift of various donors, the income to be used for the School of Medicine.	79.00
SCHOOL OF MEDICINE FUND—Created by Mary E. Woodruff M.D., and John Woodruff in 1924, the income to be used for the School of Medicine.	8,114.74

PHARMA

GRANTING MORTIMER SPURGE FUND—Bequest of William D. Granting in 1905, the income to be used for the School of Medicine.

10,000.00

CONCRETE FOUNDATION FUND—Granted by the Class of 1926, on the condition that the money should be used for the improvement of plant, including the building, with the exception of the purchase of land. Only the income may be used and the fund grows \$8,000.00 a year.

14, 475.00

NEWARK UNIVERSITY LIBRARY FUND—Granted in 1915 by members of the Board of Trustees of Newark University, who have since the time received the maintenance and expansion of the *Book Library*.

18, 367.45

SOUTHERN NATIONAL UNIVERSITY LIBRARY FUND—The year of funds donated to 1921 by the Southern University, Inc.

1, 829.00

HOSPITAL FUNDS

CAROLINE COUNTY FUND—Granted in 1911 by Mr. and Mrs. V. A. Kuhn, the income to be used for the General Hospital.

10.00

CAROLINE HOSPITAL FUND—Bequest of Mrs. SARAH A. CHAPMAN in 1911, the income to be used for the purchase of

1, 226.00

CYPRUS HOSPITAL FUND—Gift in 1911 of Washington Monument of Zeis, Fort Alpha Society, to memory of Dr. Henry

1, 000.00

HENRY HOSPITAL FUND—Bequest of Dr. H. H. H. in 1913, the income to be used for the hospital.

1, 445.00

HENRY HOSPITAL FUND—Bequest of Dr. H. H. H. in 1913, the income to be used for the hospital.

17, 431.00

KALIFORNIA HOSPITAL FUND—Gift of Samuel H. K. in 1914, the income to be used for the hospital.

2, 500.00

KALIFORNIA HOSPITAL FUND—Bequest of Anne K. in 1914, the income to be used for the hospital.

1, 000.00

KALIFORNIA HOSPITAL FUND—Bequest of Prof. K. in 1914, the income to be used for the hospital.

5, 072.00

KALIFORNIA HOSPITAL FUND—Bequest of Prof. K. in 1914, the income to be used for the hospital.

1, 550.00

KALIFORNIA HOSPITAL FUND—Bequest of Prof. K. in 1914, the income to be used for the hospital.

5, 000.00

DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1955

HOSPITAL FUNDS (Continued)

NATIONAL PARK SANITARY HOSPITAL—Bequest of citizens of National Park, Maryland, in 1906, the income to be used to carry the maintenance of a bed in the hospital.	500.00
REINHARDT HOSPITAL FUND—Bequest of Louis Weiss Reinhardt in 1922, the income to be used for the hospital.	500.00
SANITARY HOSPITAL FUND—Bequest of Beatrice F. Sullivan in 1931, the income to be used for the Cancer Clinic.	29,151.03
STANLEY HOSPITAL FUND—Gift of income of Hattie M. Strong in 1952, the income to be used for the hospital.	15,000.00
TACE HOSPITAL FUND—Created in 1911 by bequest of Lambert M. Tace, in memory of his mother, Mrs. Laura M. Tace, the income to be used to maintain a bed in the hospital to be known as the "Laura M. Tace Bed."	10,000.00

WOMEN'S BOARD OF THE HOSPITAL

BRYANT HOSPITAL FUND—Created by General C. Bryant in 1950, the income to be used for maintenance for indigent persons.	5,500.00
WOMAN'S HOSPITAL FUND—Bequest of Miss D. Q. Wadsworth in 1907, the income to be used for the nursing and treatment of female patients in the hospital.	10,000.00

HOSPITAL EQUIPMENT FUNDS

WOMEN'S BOARD HOSPITAL EQUIPMENT FUND—Created in 1954 by the Women's Board of the Hospital, the fund is for the purchase of equipment.

22,465.40

LIBRARY BOOK FUNDS

CLARETOWN LIBRARY FUND—Gift of Ethel S. Claretown in 1951, the income to be used to purchase books for the Library.	175.00
HENRY LIBRARY FUND—Gift of D. C. Maurice Clark in 1911, the income to be used to purchase books for the Library.	200.00
HUGHES LIBRARY FUND—Gift of Charles Hughes Clark Howard in 1943 in memory of Captain Dorcas Clark Howard, the income to be used to purchase books for the Library.	10,000.00
MAYNARD LIBRARY FUND—Gift of Leonard Maynard in 1944, the income to be used to purchase books for the Library.	1,000.00
NEWELL LIBRARY FUND—Bequest of Frederick W. Newell received in 1942, the income to be used to purchase books for the Library.	10,000.00
SWANSON ALUMNA BOOK FUND—Gift of Dr. Charles Chapman Swanson in 1911, in memory of the Hospital's first alumna, the income to be used to purchase books for the bookery. Amount of the fund.	2,121.00

DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1975

SCHOLARSHIP FUNDS

ANNEKE MEMORIAL SCHOLARSHIP FUND—Gift of Peter Pius Anderson in 1920 in memory of her husband, Byron Anderson, the student to be used for scholarships for education and study of students at Rutgers University, University of Maryland, or other schools.	5,194.65
BYRONNE SCHOLARSHIP FUND—Controlled by Dr. Anna Byronne Dwyer in 1946, the income is to be used for a scholarship for a student in the School of Education and an internship for a woman in the University of Maryland.	20,054.00
BEATRICE SCHOLARSHIP FUND—Bequest of Anna Beatrix in 1914 in memory of Ernest Leonard Beatrix, the income to be used for a scholarship in the School of Education.	3,794.00
CAROL SCHOLARSHIP FUND—Controlled by James K. Carr in 1932, the income is to be used for scholarships for young women.	48,200.00
CARTER, H. W. SCHOLARSHIP FUND—Gift of Henry M. Carter in 1906 in memory of her husband, Henry Harding Carter, the income to be used for scholarships in the University.	1,000.00
CARTER, M. M. SCHOLARSHIP FUND—Gift of Mary M. Carter in 1914, the income is to be used for scholarships for young women.	1,000.00

<p>BEANS, SUMNER FESS—Granted by the first Colman Woman's Club at Washington, D. C., in 1922, in memory of Frances A. Beans, the community fund for needy women in the School of Education.</p>	1,000.00
<p>CHAMBERLAIN SCHOLARSHIP FUND—Granted by the Colman Club Women at The George Washington University in 1914 in memory of Clara Rose Chamberlain, the fund to be used for scholarships for young women.</p>	2,000.00
<p>COLMAN WOMAN'S SCHOLARSHIP FUND—Gift of the Colman Woman's Club at Washington, D. C., in 1910, the fund to be used for scholarships.</p>	500.00
<p>FUND FOR COLMAN WOMAN'S SCHOLARSHIP FUND—Granted by the Colman Woman's Club at Washington, D. C., in 1920, the fund to be used for scholarships for women in Colman College.</p>	5,000.00
<p>HARRIS SCHOLARSHIP FUND—Granted by the Colman Woman's Club at The George Washington University at Johns Hopkins House, the fund to be used for scholarships for women in Colman College.</p>	5,000.00
<p>KELLEY SCHOLARSHIP FUND—Gift of the Colman Woman's Club at The George Washington University in 1915 in memory of Nellie Maynard Kelley, the fund to be used for scholarships for women.</p>	5,000.00
<p>McWILLIAM SCHOLARSHIP FUND—Bequest of Janet McWilliam, former president of Colman Woman's Club at The George Washington University, transferred to The University in 1914, the fund to be used for scholarships.</p>	1,000.00
<p>WOMAN'S SCHOLARSHIP FUND—Gift of Elizabeth Wilson in 1926 in memory of her parents, David D. and Mary H. Wilson, the fund to be used for scholarships in the School of Medicine.</p>	1,000.00

DESCRIPTION OF ENDOWMENT FUNDS (Continued)

August 31, 1955

SCHOLARSHIP FUNDS (Continued)

DAVIS SCHOLARSHIP FUND—Gift of Isaac Davis in 1897, the income to be used for scholarships	1,000.00
D. C. D. A. R. SCHOLARSHIP FUND—Created in 1913 by the D. C.-D. A. R., the income to be used for scholarships for female graduates of the American Revolution	8,227.00
DODGE SCHOLARSHIP FUND—Created in 1947 by Harryson Dodge in memory of Charles Williamson Dodge, the income to be used for scholarships	12,864.00
EDWARDS SCHOLARSHIP FUND—Gift of Hiram B. Edwards in 1913 in memory of Henry Parsons Edwards, the income to be used for scholarships for the School of Engineering	2,000.00
EVANS SCHOLARSHIP FUND—Gift of Mrs. Robert Farquhar in 1871, the income to be used for scholarships in Columbia College	1,000.00
FORD SCHOLARSHIP FUND—Bequest to Edwin Brigham Fobler in 1951, the income to be used for promoted and promoted students studying after which the income shall be used for scholarships	610.00
HARRIS SCHOLARSHIP FUND—Gift of Emily Harris Young in 1948 in memory of her mother, Anna Sigmond Harris, the income to be used for scholarships for female students in the School of Education in Columbia College	500.00
HENRY SCHOLARSHIP FUND—Bequest of Henry Elizabeth Haynes in 1911, the income to be used for scholarships, Fred Lewis Haynes, the income to be used for scholarships for female students in Columbia College for the purpose of the President's fund of the Columbia Trust	4,738.40
HENRY SCHOLARSHIP FUND—Bequest of William S. Hazen in 1920, the income to be used for scholarships	2,000.00
KENNEDY SCHOLARSHIP FUND—Gift of George Kennedy in 1911, the income to be used for scholarships, the income to be used for scholarships for female students in Columbia College for the purpose of the President's fund of the Columbia Trust	2,000.00

Manuscript Notes—Grants of Paul M. Planché to the University of Chicago, 1944, the University of Chicago, 1944, and the University of Chicago, 1944.

<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	1,500.00
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	2,840.00
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	50,000.00
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	10,000.00
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	7,422.20
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	2,000.00
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	15,710.00
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	2,500.00
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	1,954.00
<i>PAUL M. PLANCHÉ FUND—Bequest of Paul Planché in 1944, the University of Chicago, 1944, and the University of Chicago, 1944.</i>	600.00

DESCRIPTION OF INDEMNITY FUNDS (Continued)

August 31, 1955

PRIZE FUNDS

<p> <i>Beane Memorial Award Prize</i>—Gift of Paula Beane in 1917 in memory of her son, Byron Thayer Beane, the amount to be used for the annual award in chemistry. </p>	1,000.00
<p> <i>Campbell Prize Prize</i>—Granted in 1914 by John Henry Campbell, the amount to be used for annual awards in the Natural History Department. </p>	3,000.00
<p> <i>Campbell Prize Award</i>—Portions of the Willington Grant in 1941, the amount to be used to fund an annual prize for excellence in chemistry in chemistry. </p>	1,000.00
<p> <i>Campbell Prize Award</i>—Gift of Marion Campbell in 1931, to memory of E. K. Campbell, the amount to be used for an annual award for excellence in the study of English. </p>	1,000.00
<p> <i>Dyer Prize Prize</i>—Awarded in 1947, the amount to be used for annual prizes to students of the senior class who have made the greatest progress in chemistry since their entrance into the University. </p>	700.00
<p> <i>Dyer Prize Prize</i>—Gift of Helen Dyer in 1948 in memory of her late husband, John Dyer, the amount to be used for an annual award for excellence in chemistry. </p>	3,000.00
<p> <i>Eaton Prize Prize</i>—Granted in 1917 in memory of Justice Eaton, the amount to be used for an annual award for excellence in chemistry. </p>	1,500.00
<p> <i>Eaton Prize Prize</i>—Gift of John E. Eaton in 1931 in memory of William E. Eaton, the amount to be used for an annual award for excellence in chemistry. </p>	1,000.00
<p> <i>Eaton Prize Prize</i>—Gift of Mary W. Eaton in 1931 in memory of William E. Eaton, the amount to be used for an annual award for excellence in chemistry. </p>	5,519.00

1,000.00

DESCRIPTION OF PLANT FUNDS

August 31, 1955

DAVIS HARRIS HOUSE EQUIPMENT FUND—Gifts of various donors in 1953 to buy equipment for the engineering school.	112 21
PHYS. HOUSE FUND—Created by the Class of 1946 to assist in building a full house.	427 91
GRANT MEMORIAL FUND—Gifts of U. S. Grants, Ltd. to buy equipment for the Grant Memorial Room in the Library.	500 00
HISTORICAL LIBRARY OF BOOKS—	2,523 71
General Collection—Book Collection (P.O. 1950)	1,198 06
General Collection—Cambridge	404 79
General Collection—P.O.	472 00
Geographical Department	44 00
Medical Section	407 48
Physical Medicine	102 91
Physical Science	76 30
Social Department	621 72
Women's Book Collection	

LAW CENTER FUND—Created in 1945 by various donors, to be used for the acquisition of books and the payment of a building at Harvard for the use of the Law School.

Library Book Funds—GIFTS OF VARIOUS DONORS	Created
ALFRED W. DICKMAN—HISTORY LIBRARY FUND.....	1950
WILLIAM ALFRED CLUB LIBRARY FUND	1950
CHASE, RUTH JUDITH.....	1951
Class of 1945 LIBRARY FUND.....	1945
COUNCIL OF RELIGIOUS ORGANIZATIONS—JEWELRY FUND	1943
DAVIS, HARRY C., LIBRARY FUND.....	1944

HARRIS, Society Library Fund		
Harris Library Fund	1945	225.00
Merrill Evans Fund	1947	100.00
NEVES, Theodore W., Library Fund	1952	478.79
Phil Davis Endowment	1947	8,753.59
Pitt Library Fund	1953	101.50
Rivers Library Fund	1954	8.17
Society of Ministers	1948	58.23
Society of Ministers	1953	159.00
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SUMMARIES OF
DOCTORAL DISSERTATIONS

1955

THE
GEORGE
WASHINGTON
UNIVERSITY

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No. 2

SUMMARIES OF
DOCTORAL DISSERTATIONS

1955

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PREFATORY NOTE

This number of the University BULLETIN contains summaries of the dissertations which have been accepted during 1955, in partial satisfaction of the requirements for the degrees of Doctor of Philosophy, Doctor of Juridical Science, Doctor of Education, and Doctor of Business Administration at The George Washington University.

AVAILABILITY OF DISSERTATIONS

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SUMMARIES OF DISSERTATIONS
SUBMITTED FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY



HISTOGENESIS OF HAIR IN THE MINK (*MUSTELA VISON*) WITH A NOTE ON THE ROLE OF FETAL FAT CELLS

by ETHEL HELEN DOLNICK •

The cytological and histological development of hair in the skin of 23 American mink, *Mustela vison*, was studied in the fetus ranging in age from 32 to 48 days post-coitum, and in postnatal mink 1 day to 120 days of age, in relation to possible physiological factors involved in normal trichogenesis and abnormal growth. The earliest hair buds in the mink were found to appear on the face in the 32-day old fetus, when the epidermis was 2 to 3 layers of cells in thickness comprising the basal-cell layer, a discontinuous periderm, and the early stages of the *stratum intermedium*. The epidermal cells that formed the localized primordium of the earliest hair bud were richer in cytoplasmic ribonucleic acid than their neighbors.

A new type of fetal fat cell, resembling the felly of a wheel with short, incomplete radial spokes containing ribonucleic acid and fat, was discovered in the dermis of the 48-day-old fetus of the mink. The fetal fat cell appears to be involved in the maintenance and integrity of the hairs during the growth cycle.

MORPHOLOGY OF THE EARLY HAIR FOLLICLE

The epidermis in the 32-day and 36-day post-coitum fetal mink consisted of the basal-cell layer, a discontinuous periderm, and a primitive form of the *stratum intermedium*. Vascularized cells that seem to be related to the growth of the skin appeared in the epidermis of the 36-day fetus of the mink. The basement membrane was also observed in the 36-day fetus but was not found in any of the later stages.

The epidermis developed from a layer 2 to 3 cells thick in the 32-day fetal mink to a layer 5 to 7 cells thick in the 48-day fetus. In the 44-day fetal mink stratification of the epidermis appeared to be comparable to number of layers except for the *stratum corneum* which was found to be present in the 48-day old fetus. The epidermis was definitely thinner in the 15-day and the 30-day postnatal mink. At 120 days postnatal age, the epidermis was reduced to a *stratum germinativum* and a *stratum corneum*. Thus, the proliferative activity of the epidermis may be said to be at its highest peak in the early stages when the hair follicles first appeared.

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In the 32 day and 36 day-old fetuses of the mink, the mesenchymal cells were aligned in dense masses in spots directly beneath the epidermis of the cephalic and mid-dorsal regions of the skin. This was suggestive of the manner in which the forerunners of the dermal sheath and papilla appeared in the 40 day-old fetus. It would seem, then, that the forerunners of the dermal sheath and/or papilla may be present before the general body hairs appear. It was not until the 48th day of fetal development that the dermis was observed to be well-differentiated. At the 48 day fetal stage, fibroblasts, collagenic fibers, blood vessels, and a small number of tissue eosinophils were present. Strands of collagenic fibers formed connective tissue compartments in which the hair bundles were encased. The role of these elements has not been investigated.

FETAL FAT CELLS

Fetal fat cells, arranged in lobular fashion between the bases of the hair follicles of the first hair generation, appeared in the dermis of the 48-day-old fetus. This mass of fetal fat cells was richly vascularized with a newly developed network of blood capillaries. The fetal fat of the mink was distinctive by its granular cytoplasm and ribonucleic acid. These characteristics suggest a higher metabolic activity than that of the adult type of fat cell found in postnatal skin. The fat cells of the 48 day fetus apparently possessed the capacity to divide, for mitotic figures were noted in the fat cells of the 3 day-old postnatal mink but not thereafter.

The fat cells of the mink from the first day after birth to the thirtieth postnatal day were for the most part in the form of the adult mature signet ring type of fat cell. The adipose tissue of these postnatal specimens, however, retained a very small number of the fetal fat cells characteristic of the 48 day-old prenatal mink. At 42 days after birth, fully differentiated fat cells were present above the panniculus muscle between the hair follicles. These follicles were once more in a new phase of growth. The cyclic appearance of these fat cells would suggest that they are concerned in some manner with hair development.

It is generally believed that the components of the cell containing ribonucleic acid are involved in the synthesis of proteins. The fetal fat cells of the late fetal stages of the mink contained ribonucleic acid, whereas none of it was present in the mature fat cells of the 42 day-old postnatal mink. The primitive fetal fat cells of the mink possess a rim of radiating fiber-like projections that contain ribonucleic acid. Later, these wheel-like fetal cells contained sudanophilic fat droplets in the central cytoplasm, while the rim of ribonucleic acid was absent. It may

be possible that this peculiar type of fetal fat cell is capable of transformation of carbohydrates to fat.

NUCLEOPROTEINS

The epidermal cells at the focus of an early hair bud in the fetal skin of the mink are richer in cytoplasmic ribonucleic acid than their neighboring epidermal cells. This was revealed by the Pappenheim ribonucleic acid stain. It is as though these cells produce more ribonucleic acid in response to some underlying stimulus in the immediately adjacent dermal tissue. It is noteworthy in this respect that the epidermal basal cells adjacent to a basal-cell tumor are also richer in ribonucleic acid than their neighboring cells uninvolved in the tumor. This aspect of hair development and tumorigenesis deserves further study. It is not known whether cutaneous tumors develop in the mink.

TACTILE AND GENERAL BODY HAIRS OF THE MINK

The first anlage of a tactile hair was observed in the cephalic region of the 32-day-old fetus of the mink. Hair buds can be identified in the fetus as small localized anlagen swellings of the epidermal basal cells that project slightly into the dermis. Very soon after hair buds were recognizable in the mink, anlagen swellings of dermal cells in linear rows could be detected in the embryonal mesoderm that were later molded into the dermal sheath and hair papilla. Blood cells and nerve fibers appeared at the time when the hair anlagen developed, and are probably important factors in subsequent growth of the hair.

The first tactile hairs that pierced the surface of the skin were noted in the 44-day-old fetus. Follicles of the general body hairs in various stages of development were present in the 40-day-old fetus and formed four generations of hair follicles in the 48-day-old fetal mink. Also present at the 48-day stage were new anlagen of younger follicles. Follicles of the first three hair generations were comparatively large in size and produced the guard hairs. Follicles of all succeeding generations gave rise to the hairs of the undertur. At 5 days of age, a fine covering of body hairs could be seen with the naked eye. At 15 days postnatal age, some of the undertur follicles were still in the hair-pog stage. However, at 30 days, no additional anlagen were observed. In the 15-day and 30-day-old postnatal mink, it was observed that very little interfollicular connective tissue was present between the undertur follicles which undoubtedly facilitated the grouping together of these hairs into clusters. The mink appeared to have the normal arrangement and grouping of hairs of the adult animal in the oldest postnatal stage studied. There is no mass shedding of hairs at birth. However,

the appearance of "club" hairs in the 3-day, 5-day, 15-day, and 42-day-old specimens seems to indicate that the rest-period, for these particular hairs at least, is of very short duration.

The guard hairs, or coarse hairs of the pelage, are associated with three accessory structures: (1) the sweat gland, (2) the sebaceous gland, and (3) the arrector pili muscle. The guard hairs are laid down first in the development of hairs and comprise the outer stiff hairs of the pelage. They taper at both the tip and basal ends. However, the taper at the basal end is seen only in hairs that have completed their growth cycle and are ready to be shed. Just below the tip the hair is expanded for a short distance and then continues at a uniform diameter. The underfur hairs develop later and are finer, more uniform in diameter, and crimped. They make up the undercoat of the pelage. The inner root-sheath plays an important role in the shape of the hair as it is being extruded from the matrix plate at the same time that the layers of the inner root-sheath are becoming keratinized. Both guard hairs and underfur hairs show differences in the pattern of the cuticular scales.

FACTORS INVOLVED IN THE DEVELOPMENT OF HAIR

Various theories have been proposed to account for the induction of trichogenesis. Factors inherent in the skin itself may be responsible. Even in the anomaly of hairlessness produced by aberrant developmental processes, some hair follicles are formed but these do not have the mesodermal papillae. The early epidermis normally attains, in the order named, the basal-cell layer, the keratinized periderm, and the *stratum intermedium* before the anlagen of the hair follicles appear. It is known from tissue culture work that both epidermis and underlying mesoderm must be included in the explant to provide the substance for proper development of hair.

As the hair anlagen develop, concomitant histogenetic changes occur in other tissues. Hematopoiesis and the genesis of cutaneous nerve fibers may be involved in the continued growth of hair. The epidermal mass that forms the sheath of the root of the hair follicle, especially that of the vibrissal hair follicle, seems to be the focus of destination of nerve fibers in the early development of the fetus. The fat cells in the skin may also represent an important factor.

This problem may be of basic importance to the understanding of the growth of tumors of the skin in which basal or squamous cells of the epidermis invade the dermis with no mesodermal barrier. A comparison of trichoepithelioma to distorted hair follicles seems to be an important avenue for further search.

THE INFLUENCE OF ANTIBIOTICS ON EXPERIMENTAL BACTERIAL PERITONITIS IN THE DOG

by HOWARD ELLIS NOYES •

Inflammation of the peritoneum produces a profound systemic reaction that may culminate in death by shock or sepsis. In a broad sense peritonitis may be defined as a protective and reparative response of the peritoneum to injury. The local and systemic manifestations of the disease are the results of the struggle between the injurious agent and the defense mechanisms of the individual. This struggle takes place within the confines of the peritoneal cavity. The quality and quantity of the injurious agent and of the defenses determine the severity of the disease.

Present therapy may be classified as specific and supportive. Specific therapy includes careful preoperative preparation followed by a calculated effort to isolate the focus of disease surgically, as well as the administration of antimicrobial agents to counter bacterial invasion of the peritoneal cavity. Supportive therapy includes correction of altered metabolic, electrolyte, and water balance, gastro-intestinal siphonage, and general physiologic rest. The progressive reduction in mortality from peritonitis undoubtedly represents the summation effects of the above therapeutic regimen. It has been exceedingly difficult to evaluate the relative significance of any one therapeutic measure in the treatment of peritonitis. This study was designed to determine the relative influence of antibiotics in the treatment of acute bacterial endogenous peritonitis in the dog.

Certain conditions are necessary for the induction of lethal experimental peritonitis. They include (1) the presence of materials in the peritoneal cavity, such as devitalized tissues, feces, blood, bile, gastroduodenal contents, or foreign bodies, together with (2) bacteria in sufficient numbers, varieties, and virulence to produce infection, and (3) a host susceptible to the stress produced by this combination of factors. The production of lethal peritonitis in dogs is usually accomplished by ligature necrosis of the appendix previously distended with colon contents, together with the removal of the omentum at the time of celiotomy, followed by stimulation of bowel motility by oral administration of 2 or 3 ounces of castor oil. This method has the double disadvantage of robbing the body defense mechanisms of the

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omentum, which plays an important role in aiding the localizing process of the infection, and of producing hyper-motility of the intestine. Therefore, a technique was evolved for the present study that did not have these disadvantages.

Adult male mongrel dogs previously immunized against rabies and distemper were used. Their weight ranged between 9 and 14 kg. Anesthesia was induced by the intravenous injection of sodium pentobarbital in a dosage of 20 mg. per kg. of body weight. After the preparation and draping of the operative field, the peritoneal cavity was entered through a low midline incision and the cecum was delivered into the wound. A 5 to 7 mm. incision was made in the cecal pouch and the lips of the wound were cauterized with an electric cautery to keep the wound open and to produce necrosis. A small amount of caecal contents was expressed into the peritoneal cavity. The celiotomy wound was then repaired by suture in layers. In the first experiments, a rubber tube drain was brought out of the peritoneal cavity through a stab wound in the left lower quadrant for the purpose of obtaining samples of peritoneal exudate. Plugging was frequent, and this procedure was later abandoned in favor of intraperitoneal punctures, for which a 19 gauge needle and syringe were used. Hog gastric mucus (2.2 ml. per kg. of body weight) was injected at closure for the purpose of retaining the bacteria in the peritoneal cavity long enough to establish a generalized peritonitis.

Samples of peritoneal fluid were obtained periodically by a rubber drain tube or by intraperitoneal puncture. Bacteriological studies were initiated shortly after the samples were taken. Aliquots of the peritoneal fluid were sterilized by filtration and subsequently assayed for antibiotic concentrations. Urine samples were likewise filtered and assayed for antibiotic concentrations. Blood was obtained from the jugular vein and centrifuged to sediment erythrocytes. The sterile plasma was removed and assayed for antibiotic concentrations.

Antibiotic concentrations were determined by the serial tube dilution method. Conventional techniques were used for bacteriological and hematological studies. Bacteriological identifications of some of the organisms found in the peritoneal exudate were complicated by morphological and physiological variations presumably resulting from antibiotic therapy.

The surgical procedure outlined above produced a diffuse peritonitis characterized by a large amount of exudate in the peritoneum and an intact cecal fistula. An examination of the peritoneal cavity revealed a diffuse inflammatory process throughout the peritoneum with marked engorgement of the blood vessels. The abdominal viscera had lost their normal glistening appearance and varying amounts of fibinous exudate

were deposited about the peritoneal cavity. A gross examination revealed no organ pathology or peritoneal abscesses. The blood-tinged peritoneal fluid was viscous and had a pH of 7.8 to 8.0. Smears of the peritoneal exudate showed numerous leukocytes, many of which were fragmented. Numerous bacteria were present, the majority being extracellular.

Eighty dogs in which acute endogenous peritonitis was produced are included in this study. Twenty of the dogs served as controls, 20 received oxytetracycline therapy, 20 received tetracycline therapy, and the remaining 20 a combination of equal amounts of penicillin and streptomycin. Half of each group was treated by the intravenous route and the other half by the combined intravenous-intraperitoneal route. All dogs were sampled periodically for 10 hours postoperatively, and then were returned to their cages where water was readily available. No attempt was made to provide supportive therapy, such as electrolyte and fluid therapy by infusion. The animals were offered food on the day following operation. After 7 days of survival they were considered recovered. Only 1 animal died after the 7th postoperative day. This was a control which died of peritonitis on the 70th postoperative day, presumably from a mural abscess which ruptured into the peritoneal cavity.

Sampling experiments indicated that infection was present 2 hours after operation and this time was chosen for administration of the antibiotics to be tested. A single dose of 40 mg. per kg. of body weight was given.

When recovery is used as a criterion, the intravenous administration of neither oxytetracycline nor the penicillin-streptomycin combination were significantly superior to the intravenous administration of physiological saline. The former drug effected a recovery rate in dogs of only 20 per cent, the latter of 30 per cent. In contrast, tetracycline administered by this route resulted in a recovery rate of 70 per cent. The average survival time was 20.2 hours for the control animals, 37 hours for the oxytetracycline-treated animals, 40 hours for the tetracycline-treated animals, and 72 hours for the penicillin and streptomycin-treated animals. Thus all antibiotics given intravenously prolonged the survival time in most dogs. At the time of autopsy these animals had a severe peritonitis.

The use of oxytetracycline by the combined intravenous and intraperitoneal route of administration resulted in a recovery rate of 40 per cent, for tetracycline it was 80 per cent, and for the combination of penicillin and streptomycin it was 90 per cent. The controls had an average survival time of 25 hours; 61 hours for the oxytetracycline-treated animals and 17 hours for the tetracycline-treated animals. The

single fatality in the penicillin-streptomycin group survived 168 hours. The increase in survival rate from 30 per cent with intravenous therapy to 90 per cent for combined intravenous intraperitoneal therapy for the penicillin-streptomycin animals is notable. Tetracycline and oxytetracycline by simultaneous intravenous-intraperitoneal administration gave essentially the same survival rates as when the drugs were administered intravenously.

Bacteriological studies of the flora of the peritoneal exudates of these dogs revealed that three genera of bacteria, *Escherichia*, *Clostridia*, and *Streptococci*, were routinely isolated while *Micrococcus pyogenes*, var. *albus* was present in most dogs. It is probable that these four organisms are responsible for most of the pathophysiology of peritonitis in these dogs. Other organisms isolated in decreasing order of frequency were *Bacillus* sp., diphtheroids, alpha hemolytic streptococci, *Protonobacter vulgaris*, *Aerobacter aerogenes*, and *Pseudomonas* sp.

The administration of antibiotics did not completely eliminate any single species of these four groups of organisms during the 10 hours of the test period, although sometimes staphylococci and streptococci, while they could not be detected for 3 hours following therapy, were present again 5 and 8 hours after therapy. Mixed flora predominated during the test period, and the number and ratio of the different species present varied from sample to sample. In all of the animals the gram-negative organisms predominated. The peritoneal exudates of all non-survivors contained large numbers of bacteria with clostridia, streptococci, micrococci, and *E. coli* invariably present. In many instances hemolytic streptococci were recovered from the peritoneal exudate at necropsy although they had not been isolated during the test period.

In the dogs receiving antibiotics by the intravenous route, the total bacterial count of between 10^6 and 10^7 two hours postoperatively decreased about tentfold during the ten hour test period. The bacterial counts of the control group increased from a little less than 10^6 to greater than 10^8 during the same period. The total count on dogs receiving antibiotics by the combined intravenous intraperitoneal route showed an abrupt decrease from about 10^7 to about 10^4 within three hours after treatment. Thus on the basis of bacterial suppression the instillation of part of the dose into the peritoneal cavity is advantageous.

The above bacterial count patterns are explained by the antibiotic levels of the blood, urine, and peritoneal exudate. In the case of all antibiotics tested, higher antibiotic concentrations were obtained in the peritoneal exudate when half of the antibiotic was injected intraperitoneally. The higher antibiotic concentration in the peritoneal exudate resulted in from 100 fold to 1,000 fold decreases in the bacterial

count of the peritoneal exudate in these groups as compared with 10 fold decreases in the groups receiving intravenous therapy. Excretion of antibiotics via urine was more rapid in dogs receiving intravenous therapy than in dogs receiving intravenous-intraperitoneal therapy. Plasma levels of antibiotics were higher throughout the experiment in the dogs receiving therapy only by the intravenous route. It would seem that intravenous therapy not only results in the action of less antibiotic at the focus of infection, but also that the duration of its action is shortened, as evidenced by the fact that much of the drug is rapidly excreted in the urine.

Following surgery, there was a decrease in the number of circulating leukocytes in all the dogs. The counts decreased from about 15,000 mm.³ to about 12,000 mm.³ 3½ hours after surgery and returned to the pre-operative levels seven hours postoperatively. They increased to about 15,000 mm.³ 10 hours postoperatively, except in those groups evidencing the highest recovery rates. In the control group (receiving intravenous saline) the 10-hour count was about 11,000 mm.³, and in the dogs receiving penicillin plus streptomycin by the combined intravenous-intraperitoneal routes and in those receiving tetracycline by either route the count rose to about 30,000 mm.³ at 10 hours post-operatively. In all groups the differential counts of peripheral blood showed the same pattern. The ratio of polymorphonuclear leukocytes increased from about 50 per cent at the time of surgery to about 52 per cent 10 hours postoperatively, and the ratio of lymphocytes decreased from about 50 per cent to 48 per cent during the same period.

Hematocrit studies on the peripheral blood of some of the animals were carried out to determine what effect antibiotics might have on the hemoconcentration associated with peritonitis. There was a gradual increase in hematocrit from about 50 per cent to about 52 per cent ten hours postoperatively. Many of the animals—mostly nonsurvivors—had hematocrit values as high as 53 per cent. There was no significant difference between any of the groups tested so this phase of the study was discontinued. It was concluded that antibiotics had no effect on the rate of hemoconcentration of dogs with experimental peritonitis.

The development of an experimental peritonitis which approximates the clinical peritonitis that follows penetrating abdominal wounds was the result of this study. Its distinct advantage was that it permitted use of animals that were essentially normal at the time of peritoneal contamination. This method is in contrast to most other peritonitis preparations cited in the literature which, because they involved ligation of the cecum were merely simulated appendiceal peritonitis. In the present preparation, the animal at the time of peritoneal contamination had already responded not only to the surgical procedures involved, but to the abnormal condition of the cecum itself.

In most instances the exudate of acute endogenous peritonitis contains numerous species of aerobic and anaerobic bacteria. With the technique described here three to seven types of organisms, representing ten different species of microorganisms, were recovered from peritoneal exudates.

Among the organisms most frequently isolated, *Clostridium tetraglium*, streptococci and mononuclears are susceptible to penicillin and the tetracycline analogues, but are usually resistant to streptomycin. Gram-negative organisms are frequently penicillin-resistant and penicillinase-producing, but are usually susceptible to streptomycin and the tetracycline compounds. Nevertheless, none of the antibiotic combinations or regimens used in this study sterilized the peritoneal cavity. It is possible that this was due to continuous contamination of the peritoneum from the necrotic caecum or to the ability of these organisms to survive in the presence of inhibitory concentrations of antibiotics, or both.

Another result of this study was the provision of a sound bacteriological basis for the installation of antibiotics into the peritoneal cavity of patients with peritonitis. The greatest bacterial suppression occurred when the animals received half of the dose by the intraperitoneal route. On the basis of these findings, it would seem advisable to administer antibiotics into the peritoneal cavity during surgery and to consider seriously the intraperitoneal injection of antibiotics proximal to or at abdominal wounds when surgery is likely to be delayed. The danger of intestinal puncture resulting from the use of a hypodermic needle would seem to be a worthwhile risk when the advantages of administering a fulminating peritonitis are considered.

This study, like hundreds before it, leaves unanswered the question of what factor or factors cause death from peritonitis. Much emphasis has been placed on the different genera of bacteria recovered in peritoneal exudates, but no toxins or enzymes have been demonstrated as being the lethal factors. A cursory survey of the genera of microorganisms that were isolated from the peritoneal exudates of these dogs would suggest that gram-positive agents predominated. Nevertheless they did not. In terms of numbers the gram-negative organisms constituted at least 50 to 95 per cent of the organisms present at any time. It is true that the ratio of gram-positive to gram-negative organisms was higher in most of the nonsurviving animals than in the survivors, but this ratio was never greater than 1 to 10. Because of the preponderance of gram-negative organisms, one can hypothesize that endotoxin arising from coliform organisms play an important role in the lethality of acute endogenous peritonitis.

Another result of this study was the demonstration that survival

was accompanied by a decrease in the total bacterial count of the peritoneal exudates. Concomitantly the number of circulating leukocytes in the peripheral blood was increased.

It would also appear from these observations that the mechanism of action of antibiotics in the therapy of peritonitis is the suppression of the total bacteria in the peritoneal exudate to such a degree that the defense mechanisms of the body can cope with the surviving bacteria. This suppression must be effected, however, before the toxic substances elaborated by the micro-organisms produce lethal intoxication.

A STUDY OF THE IMMUNOGENIC PROPERTIES OF STREPTOMYCIN-DEPENDENT *SALMONELLA TYPHOSA*

by MORTON REITMAN*

Within the past decade a new phenomenon has come to light regarding the behavior of microorganisms to antibiotics. Bacteria which are sensitive to antibiotics have been shown to undergo a genetic change which results in mutants which not only are resistant to antibiotics but are actually dependent on them for growth. Antibiotic dependency which was first reported in 1947 in relation to streptomycin, has now been shown to occur with penicillin and chloramphenicol. Dependent strains obtained from virulent sensitive strains apparently are innocuous in animals due to the lack of a necessary growth factor, i.e., the antibiotic, in the animal's tissues or circulatory system.

The foregoing observations suggested the possibility that antibiotic-dependent strains might be used as live vaccines since it appears that they are avirulent and if they retain all the antigenic characteristics of the parent virulent strain may give a high degree of immunity. Since the majority of the work published has been on streptomycin dependency and much valuable data are now available on this antibiotic it was decided to make an immunogenic study of a streptomycin-dependent microorganism. *Salmonella typhosa* was chosen for this investigation since (1) streptomycin-dependent strains have not been reported, (2) a sensitive strain was available from which dependent strains could be isolated, and (3) the abundance of work which has failed to produce a vaccine comparable with the classical smallpox vaccine seems to indicate the possibility of an antigenic alteration as a result of vaccine preparation. When a mutation to dependency occurs, immunization with viable dependent organisms might stimulate the desired protection, provided the mutation is not accompanied by a significant antigenic alteration or even by the loss of an essential factor.

A streptomycin-dependent strain of *S. typhosa* was isolated from a streptomycin-sensitive strain. The dependent strain could not be grown on media containing less than 5 or more than 800 units per ml. of dihydrostreptomycin (DHSM). Growth of the parent strain was inhibited by approximately the same level of DHSM as the minimum concentration which was required for growth of the dependent strain. Optimal growth was obtained on 10 to 20 units of DHSM per ml., and the dependent strain was maintained on media containing a concentration of 20 units per ml. The dependent strain was found to have the

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same biochemical characteristics as the parent strain with the exception of the production of acetylmethylcarbinol and the very sparse and delayed production (7 days) of hydrogen sulfide.

While the parent strain was found to have an LD₅₀ for mice of approximately 5,000 organisms when suspended in 5 per cent mucin and injected via the intraperitoneal route, the dependent strain was found to be avirulent in doses as high as 5 million.

Antigenicity of both sensitive and dependent strains was determined by immunization of rabbits and mice. Antisera obtained in rabbits inoculated intravenously with a formalized vaccine prepared from the parent sensitive strain and a viable vaccine prepared from the dependent strain, were found to have approximately similar "H" and "O" titers. These antisera were capable of protecting mice challenged with lethal doses of virulent typhoid organisms. Antigenic characteristics of the sensitive parent and the dependent mutant strains were identical and typical of *S. typhosa*.

Active immunization of mice was determined by inoculating, intraperitoneally, 16 to 18 gram male mice (Swiss, albino, Webster strain) with 0.5 ml. amounts of viable dependent cells and challenging with virulent typhoid organisms after an interval of 7 days. Two methods for determining the protective potency of the vaccine were followed: 1) graded immunizing doses versus a constant challenge dose and 2) a constant immunizing dose versus graded challenge doses. The results of these tests show that the streptomycin-dependent strain confers immunity in mice and that a suitable vaccine dose lies between 7 million and 70 million cells.

There are many reports in the literature dealing with the establishment of partial or complete virulence of dependent organisms when the limiting growth factor is supplied *in vivo*. This does not apply to all organisms. It was, therefore, decided to test the effect of streptomycin treatment in mice challenged with our DHSM-dependent strain. Fifteen thousand units of dihydrostreptomycin in saline were administered daily subcutaneously in the back for five days in three divided doses. Eight out of 10 mice which had received streptomycin treatment along with a dose of 10 million dependent cells died within 48 hours, while 4 out of 10 mice which had received an injection of one million cells succumbed in the same period. Only 1 out of the 10 control mice which had not received the antibiotic treatment succumbed. *S. typhosa* was recovered from the liver and spleen of the dead animals and still retained its dependency characteristic. Thus, it was apparent that the organism was dependent upon streptomycin *in vivo* as well as *in vitro*. It is well established that fatal infections in the mouse are due to the toxicity of the typhoid organism and that the toxicity of the organism lies in the somatic antigens "O" and Vi with the "O" complex being

more toxic than the Vi antigen. To determine if the streptomycin-dependent strain contained an endotoxin capable of causing fatal reactions in the mouse, some extracts of the dependent organism were prepared and injected intraperitoneally into mice. A dose of 1.9 mg. (dry weight) killed 6 out of 10 mice within 48 hours. All of the mice injected with this concentration showed symptoms of toxemia.

Other workers have reported that the liver and spleen of the mouse do not remove streptomycin from the blood or store the antibiotic. Streptomycin is rapidly excreted by this animal. Also, protection of intracellular *Brucella* organisms from the lethal action of streptomycin has been demonstrated with phagocytized cells and in infected mouse spleens. It is postulated that only the first few injections of streptomycin may be available for those organisms which are present in the peritoneal cavity of the mouse. As long as the antibiotic is accessible to the organism in sufficient concentration multiplication ensues and when a toxic level is reached the animal dies. That the avirulence of the streptomycin-dependent mutant is due simply to lack of multiplication in the absence of the antibiotic is borne out by the demonstration of a lethal endotoxin in the dependent cell.

When the dependent strain was heavily streaked on DHSM agar a trace of growth appeared at the site of heaviest inoculation where the loop first touched the agar. Examination of this growth by ordinary light microscope after staining with crystal violet revealed abnormally long filamentous forms. Apparently in the absence of the essential nutrient, DHSM, the organism was still capable of growing but not of multiplication as only in a few rare instances could dividing cells be seen. The growth and what little division that does take place appears to be residual growth due to some carryover of streptomycin in the inoculum. The filamentous growth when transferred to DHSM agar was still capable of normal cell division. The same phenomenon has been observed by other workers with streptomycin dependent cells of *E. coli*.

The use of viable antibiotic-requiring bacteria as vaccines has several implications. A viable vaccine containing all its antigenic constituents in an unchanged form may be applied to humans with much greater protective qualities than the presently employed dead or attenuated vaccines. Of course, immunization with viable antibiotic-dependent vaccines would preclude therapy with that particular antibiotic for a certain limited period which must be determined for each organism. The use of dependent cultures would help reduce the incidence of contamination during production and time required for producing vaccines would be greatly reduced. A comparison of the potency of viable antibiotic-dependent vaccines with vaccines prepared by conventional techniques is indicated by this investigation.

THE GASTROPOD GENUS *ASSIMINEA* IN THE PHILIPPINES

by ROBERT HUCKER ABBOTT •

A study was made of the anatomy, ecology, habits, geographical distribution, and speciation of the gastropod genus *Assiminea* in the Philippine Islands and adjacent regions. *Assiminea* is a genus of about 100 recent species of very small, mostly air-breathing snails. Most species are found in brackish water estuaries along the coasts of tropical and semi-tropical parts of continents and large islands, although one-third of them live in temperate regions. The snail is both aquatic and terrestrial in habitat, and is equally at home submerged in water or crawling on moist earth. Its food consists of mud detritus and decaying animal matter. Most, if not all, species are dioecious with males having a large, external penis. Eggs are laid singly under water in protective, gelatinous jackets. There is a free-swimming veliger stage in its larval development.

The first species was mentioned in the literature in 1821, and to date over 250 new names have been proposed in connection with the genus. The latest revisionary work on Japanese *Assiminea* by Habe recognized no less than 11 subgenera of so-called "sections" within the genus. In our study of the Philippine species and the types of other subgenera fifteen categories of characters were analyzed to determine the relative usefulness of the sections. The basic types of characters stated were the radicle, the shape and sculpture of shell, the structure of the outer perispiral, structure of foot, and the penis. We concluded that most of the variations have arisen independently and without correlation with each other, so that no use or combination of characters can be used successfully to separate the genus into natural groups. Only one subdivision seemed to be somewhat natural and useful, the so-called *nitida* complex—a group of worldwide small, translucent, nut-brown shells with a subventral thread.

A detailed history is given of the nomenclatural argument over the use of the name *Succinea* Gray 1821, as opposed to *Assiminea* Fleming 1828. Like the majority of workers, we have accepted the latter and have formally appealed to the International Commission on Zoological Nomenclature for a ruling which would ratify *Assiminea*.

On the basis of geographical distribution, the species of *Assiminea* may be divided into two general types: (1) the typical, large, relatively thick-shelled, pastel-shaded species which are limited to the Indian Ocean

1947. H. H. Huxley, *Assiminea*, pp. 1-100. The Science Museum, Victoria, P.O. Box 187, Melbourne, Victoria, Australia. (This is a reprint of the original paper, *Journal of the Royal Society of New South Wales*, 1947, 71, 1-100.)

more toxic than the Vi antigen. To determine if the streptomycin-dependent strain contained an endotoxin capable of causing fatal reactions in the mouse, sonic extracts of the dependent organism were prepared and injected intraperitoneally into mice. A dose of 1.0 mg. (dry weight) killed 6 out of 10 mice within 48 hours. All of the mice injected with this concentration showed symptoms of toxemia.

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When the dependent strain was heavily streaked on DHSM-agar a trace of growth appeared at the site of heaviest inoculation where the loop first touched the agar. Examination of this growth by ordinary light microscope after staining with crystal violet revealed abnormally long filamentous forms. Apparently in the absence of the essential nutrient DHSM, the organism was still capable of growth but not of multiplication as only in a few rare instances could dividing cells be seen. The growth and what little division that does take place appears to be residual growth due to some carryover of streptomycin in the inoculum. The filamentous growth when transferred to DHSM-agar was still capable of normal cell division. The same phenomenon has been observed by other workers with streptomycin-dependent cells of *E. coli*.

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THE GASTROPOD GENUS *ASSIMINEA* IN THE PHILIPPINES

by ROBERT TUCKER ABBOTT*

A study was made of the anatomy, ecology, habits, geographical distribution, and speciation of the gastropod genus *Assiminea* in the Philippine Islands and adjacent regions. *Assiminea* is a genus of about fifty recent species of very small, amphibious, air-breathing snails. Most species are found in brackish water estuaries along the coasts of tropical and semi-tropical parts of continents and large islands, although one-third of them live in temperate regions. The snail is both aquatic and terrestrial in habitat, and is equally at home submerged in water or trudging on moist earth. Its food consists of mud detritus and decaying animal matter. Most if not all species are dioecious, with males bearing a large, external penis. Eggs are laid singly under water in protective, gelatinous jackets. There is a free-swimming veliger stage in its larval development.

The first species was mentioned in the literature in 1821, and to date over 250 new names have been proposed in connection with the genus. The latest revisionary work on Japanese *Assiminea* by Habe recognized no less than 11 subgenera or so-called "sections" within the genus. In our study of the Philippine species and the types of other segments, fifteen categories of characters were analyzed to determine the validity or usefulness of the sections. The basic types of characters studied were the radula, the shape and sculpture of shell, the operculum, the color of the body, the shape of the foot, and the penis. We concluded that most of the variations have arisen independently and without correlation with each other, so that no one or combination of characters can be used successfully to separate the genus into natural groups. Only one subdivision seemed to be somewhat natural and useful—the so-called *nitida* complex—a group of worldwide small, translucent, not brown shells with a subcostal thread.

A detailed history is given of the nomenclatural argument over the use of the name *Syncaea* Gray 1821, as opposed to *Assiminea* Fleming 1828. Like the majority of workers, we have accepted the latter and have formally appealed to the International Commission on Zoological Nomenclature for a ruling which would retain *Assiminea*.

On the basis of geographical distribution, the species of *Assiminea* may be divided into two general types: (1) the typical large, relatively well-shelled, pastel-shaded species which are limited to the Indian Ocean

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and Indo-Malayan region, and (2) the very small, translucent, thin-shelled group with a world-wide dispersal which we term the *nitida*-complex. No doubt the distribution of *Assiminea* is aided by the presence of a free swimming veliger stage, and possibly in the adult stage by floating debris and accidental transport by man. We suggest, for the first time, that *A. grayana* Fleming, the type of the genus and the first species described, is not native to England where it was first discovered on the banks of the Thames River as late as 1819. We believe it may be a subspecies of, or actually, *A. violacea* Heude from the east coast of China from where it was possibly transported by man during the eighteenth century.

Experiments were carried out to determine whether or not several species of Philippine *Assiminea* were capable of serving as the intermediate snail host for the human blood fluke, *Schistosoma japonicum*. On the basis of negative results and the fact that *Assiminea* spend most of their time in the vicinity of strong to slightly saline waters which are fatal to *Schistosoma* cercariae, we conclude that the genus plays no part in the life cycle of this trematode in the Philippines. However, Chen has shown that *Assiminea lutea* A. Adams serves as the first intermediate snail host for the human lung fluke, *Paragonimus westermani*. Shells of some *Assiminea* closely resemble the *Schistosoma*-carrying snail, *Oncomelania quadrasi*, but the animal of the former may be recognized by the lack of long tentacles and presence of short, stubby, ocular peduncles.

Anatomical studies of several species showed that *Assiminea* is not greatly unlike other Rissoid prosobranchs. The most important and distinguishing features are the short ocular peduncles (demonstrated by the nerves to be a welding of the tentacles and eye lobes), the almost complete disappearance of gill lamellae, an S-shaped loop of the intestine on the roof of the mantle, the presence of a large, bulbous pedal gland of unknown function buried in the mid-line of the forefoot, and a suprapodium or extra division of the foot above the main foot of locomotion.

In surveying the Philippines for *Assiminea*, it was found that each species has a definite ecological range. Some are confined to very salty river water not far from the mouths of estuaries or along swampy coastal areas where fresh water drainage produces brackish conditions; others are able to tolerate considerably less saline conditions and may be found further up the rivers where fresh-water conditions may prevail for most of the year. One or two species are able to live in both or intermediate conditions. The pH of nearby waters ranged from 6.8 to 7.4, the temperature from 78° F. to 86° F. All species are more active at night, most seek shady and moist areas in the day, but *A. philippina*, which is the only species with a calcareous operculum, may be found

crawling over moist mud exposed to direct sunlight. Several species of low grasses, mangroves, and nipa palms make up their preference in vegetation, and the molluscan genera usually found with them include *Neritina*, *Melampus*, *Cerithidea*, and rarely *Sermyla*, *Pila*, and *Glenchella*.

Of the 22 species and subspecies dealt with taxonomically, 13 occur in the Philippine Islands. Of these, 11 are limited to the Philippines. Six new species are described and their gross anatomy and habitats given in detail. A complete bibliographic catalogue of 257 new names proposed between 1821 and 1954 in connection with *Assiminea* is given; and, where possible, synonyms, type localities, and sources of other illustrations are given. Type specimens have been deposited in the U. S. National Museum.

FOREIGN EXCHANGE AVAILABILITY FOR ECONOMIC DEVELOPMENT WITH APPLICATION TO INDIA

by LEO VICTOR BONNETT*

THE PROBLEM

An assessment of the major difficulties facing the democratic world today will show that there are two tremendous and interrelated problems. The first is the threat and increasing growth of Communist imperialism which is essentially political in nature. The second, which is almost as important and is related to the first, is the rising tide of discontent sweeping over two-thirds of the people of the world . . . the fact that the impoverished countries are in active revolt against their sufferings. With the world divided into bi-polar metropolitan communities, the importance of Southeast Asia in world economic and political affairs is becoming increasingly apparent. Its immense real resources in tin, rubber, oil, and other essential raw materials have made Southeast Asia one of the vital areas of the world and an essential part of the world economy.

Side by side in Asia, two of the most populous and ancient cultures the world has ever known are on the brink of an experiment of political and economic change and modernization. China and India have both embarked upon a program of planned economic development. China will presumably continue her program under communist tutelage. India, on the other hand, influenced by political propinquity, has chosen liberal democracy as an environment for her endeavors. Each program serves as a criterion for the other, and the success or failure of either one will have a bearing on the choice of basic objectives and means to be adopted for the correct economic and social framework of an underdeveloped country seeking rapid development. India has played a historic role in Southeast Asia and the manner in which her program evolves cannot fail to have many leavening effects, political and economic, on the economies of the other countries in this area, as well as on the world in general.

The domestic resources currently available to India are considered inadequate for the rapid development of basic facilities and social overhead projects in addition to industrial expansion. For this reason, the Central Government has relied upon the private sector and foreign

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assistance to provide the major share of capital outlay for industrial plant and equipment under the Five Year Plan. Achievement, in relation to targets, has been disappointing with regard to both capital expenditure and resource mobilization. With increased deficit financing stemming from an accelerated rate of capital expenditure during the remainder of the First Five-Year Plan, and substantial budgetary deficits envisaged for the Second Five-Year Plan, large gaps appear in India's internal finance. Even though foreign aid in the form of grants and loans has already contributed 15 per cent to total investment outlay during the first three years of the Plan, present and future requirements of foreign exchange indicate a gap in external finance as well. Accelerated capital expenditure under the Second Five-Year Plan, inflationary pressure, primary emphasis on light industries rather than on agriculture give a measure of the need for additional foreign aid and of the prospective strain on India's present relatively large volume of foreign reserves. If India is to develop rapidly within a framework of economic and political stability and thereby lay the basis for regional leadership a continued and larger foreign exchange inflow is necessary. It is toward an evaluation of this basic need and of the availability of foreign exchange that this dissertation is directed.

SCOPE AND METHOD

To evaluate the dependence of India upon external resources, an analysis is required of the historico-socio-economic complex which is considered conducive to a sustained economic growth. Since the aim of the most useful type of investigation is the attempt to see social relations in the light of all disciplines in relation to a common problem, the scope and method of the analysis transcends the purely economic field. However, the quantitative tools of economic analysis can be successfully employed if it is recognized that they are symbols of a whole complex of socio-economic conditions and that policies directed toward raising the per capita income are steps in bringing the whole complex into being. Moreover, since there is no adequate or full-scale theory of economic development, the application of economic principles underlying human motives and behavior along the lines of classical economic theory is in need of refinement when dealing with underdeveloped economies. Of particular importance to India is an assessment of the social and economic factors which condition and control the scope and direction of the production and savings functions. Accepting, with reservations, the basic assumption that economic development is essentially the problem of capital formation, an inquiry into the institutions and incentives for the mobilization and canalization of domestic financial resources is essential.

ECONOMIC ENVIRONMENT

In general, the factors which retard capital formation in India stem from the poverty and the unbelievably low per capita income prevailing there. With most of the population rural in character and practicing subsistence farming, there has been little above consumption to channel into savings. The system of land tenure, fragmented holdings, the ignorance, poverty, and debt of the peasant attest to the fact that too many people are trying to wring a meagre living out of too little and too exhausted land.

Industrialization suggests itself as a remedy for the excess rural working population and the accompanying low per capita income resulting from sub-marginal production. To improve the Indian economy means to improve agriculture by transferring these surplus rural workers from the soil into other occupations. But there is a present lack of wage-goods as well as of basic facilities for an expansion of industrial activity. The immediate problem then, is to formulate a basis for the progressive integration of the agricultural and industrial sectors into a planned scheme for a balanced economic growth. This is what the Indian First Five-Year Plan attempts to do.

THE FIVE-YEAR PLAN

The First Five-Year Plan, covering the period 1951-56, envisaged an investment outlay of Rs. 20,690 million in the public sector. Sixty per cent of this outlay relates to irrigation and power, transport and communications, and basic industry. Thus, the Plan lays the basis for diversified development in industry and agriculture in the future. Moreover, a significant part of the outlay is to be devoted to social overhead, i.e., educational, medical, and communal projects. The Plan's goals in the industrial sector are quite modest because the Government felt that the scope and need for industrial development was too great for its limited resources and that it should concentrate on those areas where private capital was unwilling to enter. In the private sector, total planned investment amounted to Rs. 6,130 million. Outside the planned program, an estimate based on figures prevailing for 1950-51 relating to construction, cottage and small-scale industries, agriculture, and transport other than railways, accounted for an additional Rs. 7,250 million. Total private investment outlay for the Plan period will be, therefore, Rs. 13,380 million making total planned investment of the magnitude of Rs. 34,070 million.

The national income at factor cost of the Indian Republic was estimated at Rs. 89,000 to Rs. 90,000 million for the base year of the Plan, 1950-51. With a population estimate of 379 million and an added increment to national income of Rs. 10,000 million, per capita income

was estimated at Rs. 263 for 1956. This is in comparison to the per capita income of Rs. 255 estimated for 1948-49, and reinforces the observation made that the standard of living is to be *maintained* while enlarging the basis for future agricultural and industrial production. The ratio of net capital investment to national income was estimated at 5 per cent for India but very little information has been available on the trend in both the rate of investment and national income. The purpose of the Plan is to raise the level of investment to a little over 7 per cent of the national income. However, the aggregate of investment could only be inferred from the estimates of savings plus foreign assistance. For the period of the Plan, a total of Rs. 27,000 to Rs. 28,000 million was assumed to accrue as domestic savings. These estimates were based on the assumption that 20 per cent of the annual increment to income plus the normal savings of 5 per cent are made. In addition, Rs. 8,000 million were expected from external sources making total resources available for development Rs. 35,000 to Rs. 38,000 million.

About 60 per cent of the savings of the community will have to be channelled through the public sector. With investment outlay of Rs. 20,000 million in the public sector and Rs. 13,380 million in the private sector, the annual net capital formation approximates Rs. 6,814 million which is approximately 7.406 per cent of a mean average national income of Rs. 92,000 million. The ratio between the expected increment in income by 1955-56 (Rs. 10,000 million) and the increment of investment (Rs. 34,070 million) over the Plan period is 3.41, which is comparable to the income coefficient of investment of 3 estimated by the Planning Commission.

FISCAL ASPECTS

The significance of the budgetary position lies in its relationship to the sum total of resources available for development. The first two years of the Plan were unusual in the amount of resources made available for investment. Due to the inventory cycle of stockpiling of strategic raw materials during the Korean War, the balance of payments has reflected the changing market for Indian exports. Increased revenues from both export and import levies led to large surpluses on the current account. Moreover, there was a decided lag in capital expenditures for the same period.

Expenditures on capital account over the years 1951-54 have amounted to Rs. 8,848 million leaving some 60 per cent still to be incurred. The central budget shows a small surplus for the first year of the Plan and increasing deficits for the remaining three years inclusive of the budget estimate for 1954-55. The budgetary position of Part A States

shows that in spite of a surplus on capital account in 1952-53 and a budgeted surplus on capital account in 1954-55, the trend has also been one of progressively increasing over-all deficits. Part B States conform to the general trend of increasing deficits. It is to be noted that the Centre has been progressively increasing the assistance given to the states. It is evident that the level of investment has fallen short of the targets and that available resources have been concentrated even for this low level. Instead of indicating an adequacy of resources, the evidence suggests a shortage of resources for the duration of the Plan.

For financing the Plan, it was anticipated that public savings would contribute Rs. 7,380 million while private savings would finance another Rs. 5,200 million. These two sources, then, would contribute Rs. 12,580 million of the planned outlay. With Rs. 1,500 million in foreign assistance already received as of December 1952, the aggregate financed resources available for development were estimated at Rs. 14,140 million. This leaves a gap of Rs. 6,550 million. Envisaging the economic development of India within a framework of monetary stability, it was originally anticipated by the Planning Commission that deficit finance would be limited to the drawing down of sterling balances through import imbalance to the extent of Rs. 2,000 million. The remaining Rs. 4,550 million were expected to be met from further external assistance and, barring any additional taxation, from additional deficit financing.

Actual public and private capital accumulation during the first three years accounted for Rs. 8,360 million or approximately 42 per cent of estimated requirements of Rs. 12,580 million. Consequently, the Government accepted the principle of deficit financing in the first quarter of 1953 as an important factor in implementing the Plan and enlarged the concept in the 1954-55 budget. It has been estimated that deficit finance in the amount of Rs. 6,000 million will be required for the duration of the First Five Year Plan. With an accelerated capital expenditure of from Rs. 50,000 to Rs. 60,000 million programmed for the Second Five Year Plan and anticipated annual budgetary deficits of from Rs. 2,000 to Rs. 2,500 million, large gaps will appear in India's internal finance.

Financing of investment in the private sector under the Plan required the mobilization of Rs. 13,380 million. Of this amount, only Rs. 6,150 million relate to the planned program and Rs. 7,250 million refer to the unorganized sector. For the latter, only a few meagre details are available and they have not been delineated by the Commission. For the planned sector, anticipated private sources of investment included savings of corporate enterprise Rs. 2,000 million, refunds of excess profits tax Rs. 600 million, short-term bank finance Rs. 1,580 million, foreign investment Rs. 800 million, flotation of new issues Rs. 800

million, loans from industrial finance corporations Rs. 200 million, and government assistance of Rs. 50 million. Not much is known about capital resources in the private sector except as might be derived from the deficiency in capital outlay. Actual investment has amounted to Rs. 960 million as against an estimated investment of Rs. 2,330 million during the Plan period. The Shroff Committee has found that capital resources are practically nonexistent for small-scale industries.

In summing up the fiscal aspects of the development program, with both central and state governments experiencing a declining surplus from current revenue and government enterprise, it would appear that in the absence of additional foreign assistance and of domestic measures to increase available internal resources, inflationary pressure could result from the level of planned investment. It is to be noted, however, that recent credit and monetary policy has been anti-inflationary in character. The deficiency in investable capital resources in both the public and private sectors and the appearance of large gaps in internal finance warrant a look at the money and capital markets of India.

MONEY AND CAPITAL MARKETS

The provision of both block and working capital to Indian industry has long been a deterring factor in India's development. A preference for investment in commerce and trade, Government securities, gold, and money necessarily restricted the flow into industrial enterprise. There has always been a serious paucity of specialized private institutions for the provision of long term finance in India. The majority of modern industrial concerns have obtained their block capital from private and public subscription of share capital and direct deposits, especially in the establishment of the Bombay cotton mill industry and the Tata complex. In the absence of an organized capital market and for want of a sufficiently large investing class, the British managing agency system dominated Indian industry. The bulk of India's tea, coal, jute, engineering, paper, flour, and rice industries are managed under this system.

Due to the stagnation in the capital market, the problem of industrial finance has assumed great importance. Both the central and state governments have established industrial finance corporations to provide short and long term finance to industry. It would seem, however, that the Central Industrial Finance Corporation was having difficulty in finding even its meagre resources. Since its creation six years ago, loans sanctioned have amounted to only Rs. 210 million and of this amount only Rs. 130 million have been made available. Indian banks, in the British tradition, have for the most part remained aloof from long term financing. There is a relative absence of both institutional lenders and issuing houses. Because of too little regulation in the

securities market and the difficulty in checking the soundness of a security offer, most Indian investors preferred investing their capital at high rates in the commercial market.

Prior to 1953 the Central Government had experienced difficulty in mobilizing savings through the issue of government securities. There was little or no genuine investment demand and every year the Centre failed to fulfill its budget borrowing program. In the first two years of the Plan, there were no net receipts by way of new issues but on the contrary there was a net outgo of some Rs. 90 million on account of maturing securities. It was because of this development that the borrowing program was scaled down and the role of small savings in the development program given more emphasis. During 1953 and 1954, government securities received encouraging support in the capital market. In addition to new loans, securities amounting to Rs. 220 million held by central and state governments in their investment accounts were absorbed by the public.

However vigorous the efforts of the authorities to track down possible sources of additional revenue, it is not likely that sufficiently large amounts can be found to fill the potential gap under the First Five-Year Plan. The Central Government, however, has taken steps to direct government finance to both public and private sectors. Two new corporations for industrial financing have been set up. The proposed Industrial Development Corporation will principally start new industries with government money in those lines where the amount of capital required and the risk involved deters private capital. More recently, a new corporation called the Industrial Credit and Investment Corporation was set up. Capital subscriptions were from the International Bank for Reconstruction and Development, counterpart funds of the Central Government, and equity capital from India, the United Kingdom, and the United States. This corporation will invest mainly in the development of industries in the private sector without conflicting with the Industrial Development Corporation. Of especial significance is the proposed provision for furnishing technical, managerial, and administrative advice and assisting Indian industry in obtaining such services. It is also politically significant in that the Indian Government evidences a willingness to cooperate with foreign and private interests.

India's banking system is one of the more highly developed aspects of the economy. Banking is developed along both indigenous and modern lines. Due to the lack of banking facilities, particularly in the rural and small town areas, two-thirds of India's total money supply is held in the form of bank notes rather than bank deposits. Indian banks, in general, follow a conservative lending policy. This is particularly applicable to small scale manufacturing, agricultural, and retail trade. Few or such borrowers are able to obtain credit from either the sched-

uled or non-scheduled banks and must turn to money lenders or indigenous bankers for their working capital. The indigenous bankers play a vital role in India's internal trade, financing about 75 per cent of that trade. Efforts to incorporate these bankers into the banking system have, so far, been unsuccessful.

A distinguishing feature of the organized money market has been the disinclination of the banks to turn to the Reserve Bank for advances and rediscounts. As to the former, there is a desire to avoid the disclosure of a bank's affairs required for accommodation. The scheduled banks have generally borrowed from one another and from the Imperial Bank which, in reality, has been the bankers' bank in India. The relative absence of rediscounting stems from the shortage of the type of securities eligible for rediscounting by the Reserve Bank. The growth of a bill market, commercial or agricultural, has made little progress due to the absence of licensed warehouses and shortcomings in the marketing of agricultural products. Although capital is dear in India, the more serious problems relate to defects in industrial and financial organization as well as in Government policy. To create the financial conjuncture in which credit flows easily into preferred lines, there are various adjustments in policy and outlook required by the commercial banks, the Reserve System, and not least, the Central Government. In a nation which is trying to do so much in such a short time, the guided growth of India's money and capital markets can only be accomplished with time and a united and strong effort of the forces commanded by the Centre and states.

FOREIGN RESOURCES

In the field of private foreign investment, foreign capital has previously been concerned with the exploitation of commercial crops and raw materials. There was a general reluctance of private venture capital to enter into the domestic market. The reason why such a flow did not take place was because of indivisibilities in the economic and social structures. There was a conspicuous absence of basic facilities such as railways, communications, roads, power, and services. These facilities can only be provided by investment on a scale which the usual forces of supply and demand do not permit. In addition to this technical indivisibility impeding both private domestic and private foreign investment was the market indivisibility more commonly known as the extent of the market. But the social forces are more pervasive. The poorer a country is in skilled labor and in resources, the less capital it is likely to have, and the less it can afford to have, until the whole social and economic complex of its activities has gradually evolved a pattern of economic behavior suited to its needs. What is really in-

involved is a vast change in social beliefs and practices, for technical change is but one aspect of a mutually determining and determined process of growth of the social structure as a whole.

These indivisibilities also have a profound influence upon foreign investment policy, particularly that currently popular in official circles. It is thought that public foreign aid can be decreased *pari passu* with an increase in private foreign investment. Such a view is fallacious and indicates a basic misunderstanding of the problems facing underdeveloped countries. Private foreign investment in India, as elsewhere, must be induced by investment diapason, not forced. Private foreign investment, in a competitive society, will not freely flow until the economic and political environment is such as to invite its entry.

Other than private foreign investment, the external resources available to India for financing development are its sterling balances, its balance of payments position, and loans, grants, and technical assistance. The sterling balances are associated with deficits in the balance of payments. With its large trade, India cannot reduce its reserves of foreign exchange much beyond the level they are expected to reach by the end of the First Five Year Plan without jeopardizing the ability to meet future payments problems. In the first three years, the foreign assets held by India have been drawn down by only Rs. 1 billion which is short of the agreed releases of sterling. This favorable position was due to increased foreign aid, the American Wheat Loan, improved food crops, and deferred import demand resulting from a lag in investment outlay. While India, at the present time, possesses a relatively large volume of foreign exchange resources, the present and future requirements for capital goods, and consumer imports associated with the tempo of development and a shift in economic bias from agriculture to light industries will not only place a severe strain on them but will also induce a large gap in India's external finances. These gaps in internal and external resources, then, give a full measure of India's need for further foreign exchange if she is to develop within a framework of economic and political stability.

As to the availability of foreign exchange, India's commercial policy of export promotion is not too promising relative to need. India's largest export-gainers, jute and cotton manufactures, face increasing commodity substitution and competition from Pakistan and Japan respectively. As for grants, it is considered the best course to treat them as windfalls, welcome additions but uncertain in the light of their political connotation. Technical assistance without capital aid would be artificial and wasteful. Where the problem is one of inadequacy of resources, the sum to be invested, and its availability, will depend on the ability of India to properly program and execute projects, to provide

the necessary conditions to facilitate the absorption of capital, and to service foreign debt.

In view of the deficiencies in the mobilization of resources for the execution of her development program, India needs to adopt a more conciliatory attitude toward private foreign investment, particularly American. India needs not only the foreign funds but the technical and administrative skills which accompany them. Mutual confidence and an increasing awareness of the dependency of India and the West upon each other should lead to explorations for the provision of further public aid and technical skills.

METHODS FOR THE IDENTIFICATION AND DETERMINATION OF QUINONES, WITH STUDIES ON THE REACTION OF MENADIONE WITH BLOOD AND PROTEIN

by WILLIAM JAMES CANADY •

The K vitamins are nutritional factors which are necessary for normal blood coagulation. It has previously been shown that any one of these compounds that have vitamin K activity makes it possible for the animal to maintain a normal level of plasma prothrombin, this substance being one of the necessary factors for the formation of the blood clot.

The experimental vitamin K deficiency disease was first studied in chicks, but it can develop in higher animals. In this disease there is low clotting power of the blood. After this condition has been continued for a time, minute lesions in the blood vessel walls caused by normal mechanical trauma cause an oozing of blood from the damaged parts. Since no clot forms to prevent the leakage and help bring about repair, the situation worsens, and the animal finally bleeds to death.

The most important substances with vitamin K activity are:

- 1) 2 methyl 3 phytyl 1,4-naphthoquinone (vitamin K₁ from green plants).
- 2) 2 methyl 3 difarnesyl 1,4-naphthoquinone (vitamin K₂ from putretaction).
- 3) 2 methyl-1,4-naphthoquinone (Menadione, the therapeutically used vitamin). This is a synthetic compound.

All of these vitamins are similar in that they have the basic naphthoquinone structure in common. In order to develop methods for the determination and identification of this kind of substance, use has been made of the fact that when a compound having the naphthoquinone structure reacts with 2,4 dinitrophenylhydrazine, a very useful product is usually formed. There exists some doubt as to the exact structures but the alkali salts of the products are almost always a bright blue color when dissolved in a solvent such as alcohol. In some cases the color can be made proportional to the amount of quinone present. It is possible in this way to estimate the quantity of the vitamin originally present by the intensity of the blue color produced.

Particular attention has been given to menadione (vitamin K₃) because, among other things, it is the most widely used of the K vitamins in clinical practice.

The quantitative method developed for menadione is essentially very

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simple. The vitamin is treated in an alcoholic filtrate with 2,4-dinitrophenylhydrazine. After a suitable incubation time to allow the reaction to take place, the mixture is diluted with alcohol and ammonium hydroxide is added. The resultant blue color, due to the salt of the reaction product formed, is read in the colorimeter at 635 millimicrons. Since 2,4-dinitrophenylhydrazine can react with other carbonyl compounds which might be present, and produce a red color under these conditions, difficulties are encountered in the analysis of biological materials. The interfering substances can be removed by treating the alcoholic filtrate with anhydrous sodium sulfate and alumina which remove the offending compounds, but leave the menadione in solution.

One-half to ten micrograms of menadione per cc. of filtrate can be accurately assayed in this way. The method has been applied successfully to urine and blood.

Since the structure of a quinone hydrazone depends on the structure of the original quinone that is used as a starting point for the reaction, it follows that the 2,4 dinitrophenylhydrazine derivatives of different quinones will also have different physical and chemical characteristics which might allow them to be used for identification of quinones. This is the case.

The hydrazone of the quinone may be isolated by means of an alumina column and suitable solvent systems. During this procedure it is visible as a blue or violet band. After elution it is subjected to paper chromatography for identification. This technique can be applied to as little as 0.2 micrograms of quinone. The compound is visible at all times both on the column and on the paper. RF values ranging from 0.10 to 0.85 were obtained using concentrated ammonium hydroxide as a solvent system for the paper chromatography.

One of the long unanswered questions having to do with menadione is the mechanism by which it reacts with blood and protein and loses its biological activity. It has been known for some time that menadione can react with, and is inactivated by, cysteine. Therefore, it was decided that it was possible that the vitamin was reacting with sulphydryl groups of the protein molecule. To test this theory, rates of uptake of menadione by blood and protein were measured with and without the presence of sulphydryl blocking reagents such as iodoacetic acid and mercuric chloride. When the sulphydryl groups of the blood or protein were blocked, very little, if any menadione was taken up. This indicates that the vitamin is either reacting with sulphydryl groups or requires the presence of sulphydryl groups for reaction to take place. Such a reaction may account for the observation that the vitamin is unstable when added to feeds. Since there is protein present, it may react with the sulphydryl groups of the protein molecule.

Recoveries of parenterally administered menadione were run on rat urine. Approximately 50 per cent of the administered dose was recovered in the first 24 hour period. Very little was found in the urine after that. It was found to be necessary to hydrolyze the urine before any menadione could be recovered. Apparently all is excreted as a conjugate or as conjugates.

The results obtained with urine are in essential agreement with those of other investigators.

CRITICAL POINTS IN THE NORMAL VIBRATION SPECTRA OF CUBIC LATTICES

by NICHOLAS E. GOLOVIN*

The first modern attempt to explain the variation with temperature of the thermal properties of solids, such as the heat capacity, was by Einstein, who postulated a single characteristic frequency of vibration for all atoms in the solid and thus replaced the solid by an assembly of $3N$ harmonic oscillators, N being the number of atoms, each with an average energy given by the Planck formula. This hypothesis, while it led to a great general improvement in predicting the results of experiments in comparison with the classical theory, did not lead to satisfactory predictions at low temperatures. It was followed, and improved, by the theory of Debye in which the discrete structure of the solid was ignored except for the recognition that the total number of degrees of freedom must be $3N$, and in which Planck's formula was applied to each of the normal frequencies of vibration of the elastic continuum up to a maximum frequency such that the total number of these came out to $3N$. This theory was bound to be superseded by one which recognized explicitly the discreteness of matter, such as the theory of Born-von Karman. They assumed that the solid constitutes a lattice of atoms and proceeded to develop its thermal properties from the nature of the solutions of the equations of motion of the lattice particles.

One of the reasons for the late recognition of the Born-von Karman theory is the great practical difficulty of computing the distribution of frequencies of normal vibration in any but the simplest one and two dimensional systems. Debye's theory occupied the center of attention with practically no competition from the Born-von Karman theory until Blackman undertook a systematic investigation of the relative effectiveness of the two approaches in explaining the thermal properties of selected simple lattices. He showed, among other things, that the lattice theory implied the "heaping up" of vibrations in the vicinity of certain values of the frequency and thereby explained the success of the previous attempts, such as those by Einstein and Neust and Lande, in which one or two characteristic frequencies were employed instead of the spectrum of $3N$ required by the more exact theories. He pointed out that although in the limit of extremely low temperatures the Debye theory is expected to be exact, there is a low temperature region—immediately above these extremely low temperatures—where the predictions of the lattice theory should lead to a frequency distribu-

tion function significantly different from that of Debye. He also emphasized the failures of the Debye theory through an analysis of the temperature variation of the supposedly constant Debye temperature in monatomic crystals of all important types.

Much of the recent work in developing the Born-von Karman theory has consisted of attempts to find satisfactory methods for numerical approximation to the frequency distribution function $g(\nu)$ entering into the Planck specification for the total energy of the solid, namely,

$$E = \int_0^{\nu_{\max}} \frac{h\nu}{e^{h\nu/kt} - 1} g(\nu) d\nu$$

Other important work has involved analytical studies of the nature, number, and location of the singular points of $g(\nu)$ since it is the existence of such points which is responsible for the distinctive differences between the Debye and the Born-von Karman versions of this function. Both directions of research have been recently brought together by the demonstration that one of the methods of approximation, the so-called "method of moments" introduced by Montroll, can be modified so that it becomes extremely efficient in estimating $g(\nu)$ if the nature and location of the critical points of ν (with which the singular points of $g(\nu)$ are associated) has been established. Thus it has become important to develop a procedure for locating the critical points. Monatomic lattices have been extensively studied in this connection during the last few years.

Montroll, through the development of an analytical expression for the square lattice, was able to locate its singular points and, thereby, stimulated the work of Smollett and Van Hove. Smollett extended Montroll's results to the square ionic lattice and suggested an analytical method for studying the nature of the singularities of $g(\nu)$ which was immediately extended by Van Hove to three dimensional lattices. Van Hove also applied a theorem on the singular points of periodic functions to the frequency of normal vibrations as a function of position in wave number vector space to show that the frequency spectrum of a monatomic three-dimensional lattice must have at least eight critical points. Subsequently Newell and Rosenstock have attempted to develop direct methods for locating these critical points, and this is the specific problem on which this paper is focused.

The simplest lattices of practical interest are the three dimensional monatomic cubic lattices. The objective of this paper is to develop a general analytical procedure for locating all physically significant critical points in the frequency spectrum of the simple, body-centered and face-centered cubic lattices, the forces of interaction among atoms being bur-

ited to effects of nearest and next-nearest neighbors and assumed to be functions only of the distance between atoms.

The secular equations for any one of the three cubic lattices can be written in the form:

$$(1) \quad X^3 + AX^2 + BX + C = 0$$

where A , B and C are functions of the cosines of the angles ϕ_i , defined in the intervals $0 \leq \phi_i \leq \pi$, and $X = \Omega^2$ where Ω is proportional to the frequency of normal vibrations associated with the point (ϕ_1, ϕ_2, ϕ_3) . The solutions of (1) can be organized into three single valued branch functions of the $\cos \phi_i$, R , S , T , where the three solutions of (1) at any point in ϕ -space, X_1 , X_2 , X_3 are distributed among R , S , T , in accord with the rule, for example, $X_1 = R \geq X_2 = S > X_3 = T$. It is assumed that the branch functions R , S , T have appropriate continuity and differentiability conditions throughout the fundamental cube.

We now construct the three derivatives of (1) with respect to the ϕ_i :

$$(2) \quad \frac{\partial X}{\partial \phi_i} (3X^2 + 2AX + B) + A^i_1 X^2 + B^i_1 X + C^i_1 = 0 \quad (i=1, 2, 3)$$

If at a given point in ϕ -space one of the branches, say R , has a critical point then the equations (2) reduce to the three equations:

$$(3) \quad A^i_1 R^2 + B^i_1 R + C^i_1 = 0 \quad (i=1, 2, 3)$$

However, the fact that R satisfies the equations (3) at a given location does not assure that R has a critical point there, since (3) will also be satisfied if the roots of (1) are degenerate at the point.

An analysis of the structure of A^i_1 and B^i_1 for the cubic lattices shows that we can always write:

$$(4) \quad A^i_1 = s_i \alpha_i, \quad B^i_1 = s_i \beta_i \quad (s_i = \pm \sin \phi_i, i=1, 2, 3)$$

This means that A^i_1 , B^i_1 can vanish for either of two reasons: (a) $s_i = 0$ or (b) $\alpha_i = \beta_i = 0$. It is also easily shown that if $A^i_1 = 0$ for any i then $B^i_1 = C^i_1 = 0$ as well.

At a critical point the equations (3) must have a root in common. This requirement implies certain relationships among the A^i_1 , B^i_1 and C^i_1 for the different values of i , and the nature of these relationships depends, for example, on which of the A^i_1 , B^i_1 vanish on whether at the critical point the roots are also degenerate, etc. Since each of the functions A^i_1 , B^i_1 , C^i_1 is a polynomial in the physical parameter T , the question then arises as to whether such relationships persist for all values of

T for intervals of T or only for isolated values of T . It is noted that the only physically significant relationships must be those which persist over intervals, or over the entire range of T . Since the relationships in question are polynomials in T , it then follows that all physically significant relationships vanish identically in T . One of the important consequences of this analysis is the result, looking at the equations (4), that if $s_i \neq 0$ but $z_i = 0$, then except for at most two particular points in ϕ -space, $\bar{z}_i = 0$ in each lattice at most only for isolated values of T . This conclusion is proved by introducing, into the expressions for the \bar{z}_i of the three lattices, the implications of the conditions $z_i = 0$ and then observing the circumstances under which the resulting expressions for the \bar{z}_i vanish identically in T . Because of this result we then draw the important conclusion: if $s_i \neq 0$ and $A^i_i = 0$, but $B^i_i \neq 0$, for any i , there can be no physically significant critical points except for the cases where $A^i_i = 0$, all i , and these lead to the exceptional points mentioned above. It then follows that in locating the physically significant critical points of (1) we need to consider only the following possibilities:

- (a) $A^i_i \neq 0$, all i
- (b) $A^1_1 = A^2_2 = A^3_3 = 0$
- (c) $s_i = 0$, s_{ii} , $s_i \neq 0$
- (d) $s_i = s_{ii} = 0$, $s_i \neq 0$
- (e) $s_i = s_{ii} = s_i = 0$

If $A^i_i \neq 0$, all i , returning to the equations, we note that R must be a common solution of all three of these equations. If such is to be the case we can get a relation among the functions A^i_i , B^i_i , C^i_i , by eliminating R from these equations. A direct way to do this is to employ Sylvester's Dialytic Method of Elimination which relates the coefficients of a pair of polynomials if these polynomials have a common root. Relations among the coefficients are thus found to be of the form:

$$(5) \quad (A^1_1 C^1_2 - A^1_2 C^1_1)^2 - (A^1_1 B^1_2 - A^1_2 B^1_1)(B^1_1 C^1_2 - C^1_1 B^1_2) = 0$$

where this particular equation follows from the requirement that R is to be a solution of the first and second of the equations (3). From the structure of the functions A^i_i , B^i_i , C^i_i for the cubic lattices, it then follows that relations such as (5) cannot be physically significant unless

$$A^1_1 = A^2_2, B^1_1 = B^2_2, C^1_1 = C^2_2$$

Since there are two equations of the form (5), the other one linking A^1_1 with A^2_2 or A^3_3 , A^2_2 , we then conclude that if $A^i_i \neq 0$ for all i , and a critical point is involved:

$$(6) \quad A^1_1 = A^2_2 = A^3_3 \quad (\text{or } C^1_1 = C^2_2 = C^3_3 = C)$$

Inserting the conditions (6) into the secular equation, solving it for the three branch functions (which are found to be doubly degenerate) and then imposing the condition for the existence of a critical point in each of the branch functions, we get the critical points which can appear on the main diagonal of the fundamental cube.

Alternative (b) is a special case of equation (6) and the roots, therefore, will be doubly degenerate. However, it can be shown that if $A_i = 0$ but $B_i \neq 0$ for any i , and a critical point is involved, then the roots cannot be degenerate at the point. Hence, no critical points correspond to alternate (b).

If $s_i = 0$, then there are left just two of the equations (3). If these are to have a common solution then the conditions of the general form of (5) lead to the requirement that $C_i = C_j$, which means that any critical points involved will be found on the diagonal of the cube faces, $s_i = 0$ or $s_j = 0$. If $s_i = s_j = 0$, $s_k \neq 0$, then there is only one of the equations (3) left so that we cannot use arguments similar to the above. However, in this case the secular equations attain a particularly simple form and can be directly solved for the three branch functions. The possible critical points, now on the cube edges, are then located as above. If $s_i = s_j = s_k = 0$, we have the specification for the eight cube corners so that each of these is a critical point of ϵ .

It is thus proved that all of the physically significant critical points in the frequency spectrum of the cubic lattices are located on the corners, edges, diagonals of the faces, and on the principal diagonal of the fundamental cube in wave number vector space. Since the secular equations for the above lattices can be readily solved in each of these cases, the critical points are then found by applying the conditions for criticality in each branch of the solution.

This method of analysis appears applicable to more complicated lattices and force systems. It was applied to locating critical points in the approximation for a metallic lattice in which, in addition to Hooke's law forces, there is introduced the Fermi electron gas for taking account of the conduction electrons. Critical points were found on the main diagonal and cube corners as for the simpler case treated above, but also those faces and edges contained critical points which also contained the origin of the ϵ .

AN INVESTIGATION OF THE "HALO EFFECT" AND OVER-ALL EVALUATION IN SUPERVISORY RATINGS

by HOWARD JAY HAUSMAN*

Supervisory ratings have for many years been a prime source of criteria in psychological research. In view of the central importance of criteria in psychological research, an investigation which can offer reasonable explanations for some of the frequently encountered ambiguities of supervisory ratings can help to increase the usefulness of this device. The present research, then, is intended to clarify two major issues of the supervisory rating:

1. What is the meaning of the over-all rating?
2. What is the meaning of the "halo effect"?

The "halo effect" is a phenomenon found universally in supervisory rating scales. It refers to the high intercorrelation among the ratings made by a single supervisor, no matter what the characteristics being rated. This apparent lack of independence among the items in a rating scale has led to much speculation about the ability of a rater to evaluate qualities which should logically be distinct in an individual. There is a widespread opinion that the typical supervisory rating contains little more than halo, and that halo—and the typical rating—is explained by a general or over-all impression which the rater has for the ratee. Prominent among the studies usually cited in support of this explanation of the halo is one by Ewart, Seashore, and Tiffin[†], which reports a factor analysis of a rating scale to have shown only two correlated factors, one of which was much more prominent and loaded on every item in the scale.

An alternative explanation for halo is that it represents the personal interaction of the rater and ratee. The reasoning is that these personal interactions play a large part in the rater's perception of satisfactory item and that halo is the extent to which the feeling of satisfactory personal relationships on the job are reflected in each item. A factor analysis by Moore[‡] of a large number of items showed that the general factor seemed to be strongest in those items reflecting personal interactions. Kallejian, Brown, and Weschler[§] employed a clinical psychologist to conduct interviews of subordinates concerning their

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† Ewart, E., Seashore, S. E., & Tiffin, J. A factor analysis of an industrial merit rating scale. *J. Appl. Psychol.* 1941, 23, 451-456.

‡ Moore, J. V. A factor analysis of subordinate evaluations of non-committed superiors. San Antonio, Texas: Human Resources Research Center, Oakland Air Force Base, Apr. 1951. (Research Bulletin 61-5.)

§ Kallejian, V., Brown, J. K., & Weschler, I. R. The impact of inter-personal relations on ratings of performance. *Public Personnel Review*, 1953, 12, 160-170.

relationships with co workers and superiors. The clinician then diagnosed the personalities of the supervisors and predicted how the group would be rated by each supervisor on one over-all and seventeen specific rating items. The predictive ratings agreed significantly with the actual ratings made by the supervisor, and were primarily based on the quality of the interpersonal relationships within each supervisor's group as judged by the clinician.

RATIONALE OF PRESENT RESEARCH

The research described here is based on the assumption that a good supervisory rating item's variance can be partitioned into: (1) "true" variance on the trait it is meant to assess, (2) halo variance, (3) specific variance, and (4) error variance. Factor analysis of supervisory rating scales provides the framework for the research, with the expectation that Holzinger's bi-factor pattern would emerge as the factorial structure most suited to supervisory ratings. It was also reasoned that an over-all rating is an integration of the separate qualities found in the individual, with appropriate weights for each in the single over-all evaluation. In that event, an over-all item should turn out to be factorially complex. But a factorially complex item cannot be used as a simple explanation for the halo effect, which is defined mathematically as the general factor which emerges from a factor analysis. Thus the "general impression" explanation of halo is logically inconsistent, and the alternative personal interaction hypothesis becomes more tenable.

Four hypotheses form the basis of this dissertation:

1. The supervisor is able to rate several different qualities in his subordinates, rather than one amorphous and undifferentiated thing called halo. He should be able to rate technical skill and motivation to perform, to some degree.
2. A supervisory rating item can best be described in terms of a bi-factor pattern, with loadings on the general factor and its own specific area.
3. The supervisor's over-all rating contains elements of several different traits, including those which he rated in detail.
4. The halo effect in supervisory ratings is best explained by items reflecting the interpersonal relationships of rater and subordinate.

This kind of item is also a crude measure of the worker's motivation to perform his job.

RESEARCH DESIGN

A series of four interlocking studies was carried out, using supervisory rating scales. In the first study, it was necessary to determine

whether several distinguishable traits were actually being measured in supervisory ratings. This was done in two ways: first, by cluster analysis of the rating items; second, by relating the identifiable clusters to external measures of the same traits apparently rated by the supervisors. The study was carried on in the setting of aviation maintenance in the United States Air Force, with supervisory ratings on three samples of aircraft mechanics.

The second study was a more intensive analysis of the supervisory ratings of aircraft mechanics, following the appearance of consistently favorable results in the first study. A multiple group factor analysis was performed and the meaning of the results examined in detail.

The third study was a cross-check of the significant findings of the previous work on another occupational group, low-level clerical supervisors in a federal agency. A multiple group factor analysis was also performed on the ratings obtained on this group.

The fourth study was an attempt at practical application of the findings of the foregoing investigations by the validation of selection tests for administrative internes in a federal agency.

RESEARCH RESULTS

In the first study, a 54-item rating scale was used to obtain ratings on three samples of aircraft mechanics, with 59, 68, and 41 cases. An over-all rating was also obtained immediately after the detailed rating items. A rough approximation to component factors was achieved by Holzinger and Harman's B-coefficient*. Five distinct clusters of supervisory ratings were found: technical ability, job satisfaction, industriousness, relations with co-workers, and personal interaction.

Scores were calculated for each cluster by adding items. The resulting rating scores had intercorrelations ranging from .54 to .82, and the range of correlations of the clusters with over-all ratings was .40 to .71.

A test of technical competence which had previously been developed for these aircraft mechanics was administered. It was then found that this test correlated significantly with the Technical Ability cluster of the supervisory ratings (with an r of .37), but the correlations with the other clusters ranged from .02 to .19. Thus the rating for Technical Ability seemed to have some objective validity and could be differentiated from the other rating elements.

An inquiry into the meaning of the other rating clusters came up with the tentative conclusion that they represented motivational variables to some extent. This conclusion was based in part on the finding that

* Holzinger, K. J., & Harman, H. H. *Factor analysis*. Chicago: The University of Chicago Press, 1941.

each of these ratings added significantly to the test in predicting over-all proficiency. In part on a tendency of the supervisory rating clusters to correlate significantly with self ratings in the same area.

In the second study 154 sets of supervisory ratings were obtained on aircraft mechanics with a 48 item rating scale, plus one over-all rating item. This scale was constructed by making up the item clusters isolated in the first study. When a multiple group factor analysis was applied to these data and an orthogonal structure matrix obtained, a 10-factor pattern was found for the five factors: personal interaction, job satisfaction, relations with co-workers, cooperativeness, technical ability.

The set of items designated Personal Interaction actually represented the general factor, while each of the other sets of items showed a bi-factor variance with heavy loadings on the general factor and the factor representing the face valid content of the item. Moreover, there was almost no overlap of significant loadings for an item in group factors other than its own. As predicted, there was a distinct tendency for the over-all item to be factorially complex.

Since the major hypotheses of this dissertation were apparently confirmed by the second study, with obvious implications for the interpretation of supervisory ratings, these results were checked in a third study on civilian clerical supervisors. A rating scale of 41 items was built around the factors already identified, and three over-all items were added, with 143 ratings used in the factor analysis.

The resulting multiple group factor analysis produced results almost identical with those of the second study. The factors extracted were exactly the ones hypothesized, and were personal interaction, job satisfaction, technical ability, relations with subordinates, and over-all. Again the items for Personal Interaction represented the general factor, and the others clustered in distinct and non-overlapping groups. Over-all items were factorially complex.

The fourth study was designed to apply the evidence of differential validity of ratings to a set of selection tests for administrative internes. The following rating elements were used: personal interaction, technical ability, and over-all. Validity coefficients were rather low, and the differential effects predicted were not clear cut, with the exception of the superiority of the over-all ratings in this situation. Since the selection tests were more of the "aptitude" variety than of the achievement type, it is possible that differential validity of ratings on specific traits would be true for achievement than for aptitude test. On the other hand, the over-all items were expected to show greater correlation with the tests because this kind of item integrates Technical Ability and Personal Interaction. The over-all rating showed that the tests could be useful

as selection instruments, with a multiple R of .31, whereas Technical Ability and Personal Interaction had multiple R's of .24 and .21.

DISCUSSION OF RESULTS

The peculiar nature of the over-all rating, with its factorial complexity, indicates that this is the most valid single measure to use in validation of predictor instruments. The process of integrating several facets of the job requirements implies that the rater can discount irrelevantencies and compensate for varying levels of experience among ratees, thereby weighing extenuating circumstances a little more in his evaluation. When the level of experience can vary within wide limits, a rating of sheer Technical Ability may be misleading as to the value of a predictor instrument. This is clearly shown by not only the data of the fourth study but also for each of the three samples of aircraft mechanics in the first study.

The reasons for this finding are complex, and call for an examination of the probable elements associated with acquisition of job knowledge. In order to become competent, a worker must have a minimum of "natural ability". In addition, however, he must have positive motivation toward succeeding in the job in order to achieve a level of skill commensurate with his "natural ability". Then there is the experience factor, or time on the job, which further complicates matters.

The complicating effect of a worker's experience on his supervisor's rating of him on any trait may be considered in detail. An inexperienced worker probably receives a low rating on Technical Ability, and probably makes a relatively low test score. As a matter of fact, if he shows low achievement, the supervisor cannot be sure whether it is due to low experience or lack of basic ability, and so the validity of his Technical Ability rating is attenuated. On the other hand, a worker of long experience who shows little skill is classified as low in Technical Ability with more certainty. Thus a valid test may correctly rank order the skills of inexperienced men but the supervisor may not accurately gauge the relative abilities of those men, the same valid test may be better related to supervisory ratings of experienced men because of the increased accuracy of ratings made on such workers.

Similarly with ratings of job satisfaction, the supervisor probably finds it difficult to assess the job adjustment of inexperienced men. Their attitudes often are naive and may shift widely with progress in learning the job. Many will enter the occupation highly enthused, although their skill level at this stage might be unrelated to their enthusiasm. Therefore supervisory ratings of job satisfaction (or worker's motivation in general) should be almost uncorrelated with test score for the beginner. For the experienced man, however, more ac-

curacy in rating might be expected, and moderate correlation with a test of competence might be found.

It is possible, however, for the supervisor to overcome some of the handicaps of trait ratings when making an over-all evaluation. He may compensate for lack of experience so that he places the worker a little more precisely within his own experience level, thus giving a more balanced appraisal. Less difference in the relation of test score to over-all rating is therefore to be expected between groups of experienced and inexperienced men than in the correlations of test score with trait ratings.

The expected differences in correlation size were found in each of the three samples of aircraft mechanics in the first study when each sample was divided into an upper and lower half on length of experience as a mechanic. The differences in correlation for the combined experienced and inexperienced samples were statistically significant—except for the correlations between test score and over-all rating, which were expected to be closer together. This finding shows why over-all ratings are a tool of superior validity in many cases, as well as illustrating the factorial complexity of the over-all rating.

IDENTIFICATION OF TRAITS RATED VS. INTERCORRELATION OF TRAITS

The various factorial studies identified several traits which supervisors apparently are able to rate; there are probably other important un-rated traits which are ratable but which were not included here. Since the pattern of the factors was bifactor in nature, there was sizable intercorrelation among the trait scores. This kind of intercorrelation is commonly attributed to the halo effect, but that tells only part of the story. A factor analysis of trait scores may be considered analogous to a second order factor analysis. When the intercorrelation of trait scores for the second and third studies were factored, in each case two orthogonal factors were found. The first was obviously due to the variance the traits held in common or halo. The second, however, was a bipolar, with traits predominantly oriented toward the one pole and traits oriented toward people at the other pole.

This finding in the two studies led to a further examination of the halo, reported by Ewart, Sealmore, and Tulin*. A great similarity was found in the pattern of intercorrelations between trait ratings as determined in the mechanic and clerical supervisor studies, and the trait ratings of Ewart, *et al.* In this case three factors were found, but the first was obviously specific to one trait. The other two factors showed the same pattern as the pairs in the two studies of this dis-

*Ewart, E., Sealmore, S. L., & Tulin, J. A. A factor analysis of an industrial merit rating scale. *J. Appl. Psychol.*, 1947, 32, 411-420.

sertation. The first was variance common to all traits, the second showed a "things vs. people" clustering of traits.

This result raises the possibility that many studies showing high trait intercorrelations might first have established that differentiable traits were being rated by using specifically worded items in the manner employed here. This may explain why most factor analyses of rating scales in the past have been unsatisfactory. If the *trait scores* derived here are essentially the *trait ratings* of other studies, then factor analyses of the single item trait ratings have merely shown the organization or clustering of supervisors' evaluations of traits but have shown nothing about the traits themselves. In this way the study of Ewart, *et al.* long standing as a prime source for a diametrically opposed theory of supervisory ratings, can now be explained as an inevitable result of using generalized items of unknown factorial content. The findings of this dissertation, then, are not inconsistent with those of Ewart, *et al.*

CONCLUSIONS

Each of the hypotheses concerning the structure of supervisory ratings has been confirmed. In brief, these were:

1. The supervisor can rate several different traits, instead of only halo.
2. A supervisory rating item is bi-factor in structure.
3. An over all rating contains elements of several different traits, including those rated in detail.
4. The halo effect in supervisory ratings is explained by items reflecting the interpersonal relationships of rater and ratee.

In view of the confirmation of hypotheses, a theory of supervisors' ratings is offered:

A set of conditions can be generated whereby supervisors can rate their subordinates in at least several traits, as required by the content of the items; each rating item, however, has a bi-factor structure, and halo dominates but does not obscure all the trait items. Halo is a psychological set of the rater based on his feelings of how easy it is to supervise the ratee, or how much friction exists in their interpersonal relationships. An over-all rating is factorially complex and does not explain the halo effect. There is a simple structure of trait ratings along the "things vs. people" continuum, which in the past has tended to confuse factor analysts of rating scales since not all traits in their scales fit neatly into these categories and also because of the more prominent general factor, so that the single item trait rating appears to fall in differentiating among traits. Finally, although supervisory ratings are a valuable criterion source for the validation of predictors,

the role of such interlocking variables as length of experience, motivation toward the job, aptitude for the job, and initial level of proficiency must all be carefully considered before choosing hypotheses about the size of a validity coefficient for the supervisory rating.

THE MEANING AND MEASUREMENT OF NATIONAL PRODUCTIVITY

by JOHN WHITEFIELD KENDRICK •

It has been the purpose of this dissertation to develop the concept of "total productivity" with special reference to the national economy; to discuss the component concepts of net output and factor input in order to make precise the meaning of the productivity ratio; to analyze the problems involved in the statistical implementation of the concept; alternative solutions to which affect the movement of productivity estimates; to undertake the measurement of total productivity in the United States for selected years; to evaluate the estimates in the light of the conceptual and statistical problems involved; and to indicate the uses to which measures of productivity may be put.

It is this writer's thesis that if productivity estimates are to indicate the changing productive efficiency of the economy (or of smaller producing units) in the use of resources, the physical volumes of outputs must be related to the physical volumes of all corresponding economic inputs weighted by unit factor costs and unit factor prices respectively. In practice, the term "productivity" has been used more broadly to denominate the ratio of output to the several resource inputs individually. The most generally employed "productivity" concept has been output per man-hour.

The individual physical output-input ratio, or "partial productivity" measure, is useful as an indicator of the saving in a particular factor which has occurred over time. But the total productivity measure, which is a weighted average of all the partial productivity measures, indicates the net saving in all the inputs and thus reflects the changing productive efficiency of the producing organization as a whole. A partial productivity ratio reflects changes in productive efficiency only in so far as inputs are combined in constant proportions over time. Actually, the combination of factors usually changes over time as technology advances and as relative factor prices change. Thus, the partial productivity ratio is affected by factor substitutions as well as by changes in productive efficiency.

The importance of improvements in productive efficiency as a means of increasing economic welfare and national strength was early recognized by writers of the mercantilist era, and the theme was raised by Adam Smith to a central position in *The Wealth of Nations*. Ricardo's appraisal of secular productivity trends became the foundation of his

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theory of value and distribution in the long run, although subsequent technological advances in Western nations have belied his pessimistic conclusions. With the "marginal revolution" of the 1870's, the focus of economics shifted to equilibrium value theory under static assumptions, but concern with economic change continued in certain fields of economics and has increased markedly in recent years.

The earlier writers tended to think of productive efficiency in terms of a ratio of output to direct and indirect labor inputs. Smith, for example, spoke of the "productive powers of labor". While he did not overlook the contributions of capital and land to the productive process, he sought a labor equivalent to the property inputs. The socialists, on the other hand, denied that capital creates value over and above that given off by the labor embodied in instruments as they are consumed by use. But with the development of capital theory and the marginal productivity analysis, it was generally recognized that capital is coordinate with labor as a producer of value, and it was suggested that capital be measured in terms of its own units. Alfred Marshall clearly recommended that changes in productive efficiency should be measured in terms of the relationship between physical volumes of output and labor and capital inputs. Another Englishman, G. T. Jones, attempted in the 1920's to implement the concept of "increasing return" statistically with reference to selected British and American industries.

In the United States, estimates of productivity until recently had been made almost entirely in terms of the output per worker or per man hour concept. This may be attributed to the fact that the pioneering studies, beginning in the 1820's and considerably elaborated in the 1920's, were conducted by the Bureau of Labor Statistics which was naturally interested in labor requirements. Studies carried out in the 1930's by the National Bureau of Economic Research, the National Research Project and Brookings Institution had the same slant due partly to the concern with "technological unemployment" in that decade and also to the fact that employment estimates were relatively abundant, while estimates of other inputs lagged. Since 1947, however, an increasing number of students have attempted to measure total productivity in the firm, industry, or national economy. This approach has been facilitated by the recent availability of real capital estimates for the economy and various industries.

The meaning of total productivity, and its differences in relation to the conventional "labor productivity" measure, can be pointed up by drawing on the estimates of national productivity in the United States presented in the Statistical Appendix. Between 1920 and 1952, the real net product (in 1929 prices) of the domestic civilian economy increased at an average rate of around 3.2 per cent a year. Half of

this growth, or 1.6 per cent, was due to rising total productivity, and the other half due to the growth of total factor inputs. Real net product per unit of labor input increased at an average annual rate of 1.8 per cent. This difference of 0.2 per cent a year measures the effect of factor substitution, defined as the specific factor input (labor, in this case) divided by total factor input.

Real product per man-hour increased by 2.2 per cent a year on the average over the same period. The difference between this rate and the 1.8 per cent rate of increase in real product per unit of labor input illustrates another facet of the productivity concept as developed here. Labor input is computed by weighting the man-hours worked in each industry by the average hourly earnings in each during the base period. Total man hours are unweighted. Thus, weighted labor input reflects the relative shift of workers to higher paying industries. The same effect is evident in the weighted capital input estimates as compared with the unweighted.

The rationale of the weighting procedure is that the relative earnings of resources in different uses reflect different "quantities" of input approximating the differences in marginal product of the resources in their various occupations. On this basis, productivity in the economy is a weighted aggregate of productivity in the component industries, and is not influenced by interindustry shifts *per se*. The productivity measures using unweighted inputs, on the other hand, may show gains even if there has been no increase in efficiency in the component industries—gains which show up in input in the weighted measures.

If the earnings of the resources in the base period were distorted by market imperfections or disequilibrium due to unanticipated dynamic changes, it could be maintained that to this extent shifts of resources to more remunerative occupations represent a gain in efficiency. This type of gain is better termed an increase in economic efficiency, however, in so far as it reflects an improved distribution of resources in respect to the community's wishes. Our measure reflects gains in productive efficiency as such. It is influenced chiefly by technological innovation in the long run, but also by the net effect of tendencies towards increasing and diminishing returns and by different rates of utilization of fixed factors with given technical knowledge.

It would help avoid confusion if the partial ratios were labelled descriptively rather than called productivity measures, since they are not theoretically precise measures of changes in efficiency of the producing unit or of the specific inputs in terms of their contributions to the product. Nevertheless, our estimates show that output per unit of labor input has been a fairly good indicator, in general, of long-run trends in total productivity in the United States and specifically, of reductions in real labor cost per unit. This is due to the fact that labor

has comprised almost three quarters of total factor input, and that while capital has grown faster than labor input, the trends were not greatly divergent. Over shorter periods the correspondence may not be so great.

The correspondence between the ratio of output to labor input and total productivity may be expected to be less in individual industries than in the total economy because of the importance in most industries of intermediate product inputs which reduce the relative weight of direct labor input. To be consistent with net national productivity, however, industry output and input must both be measured net of intermediate product purchases in order to eliminate duplication of the output of one industry with the input of another. The ratios of net output to labor input should be fair approximations to total factor productivity over the long run in most industries except those in which capital has a heavy weight and has shown a significantly divergent trend relative to that of labor input. It is still better, of course, if we measure capital stocks and inputs by industry, in order to get the total picture.

Since productivity is a composite concept, productivity estimates achieve precise meaning only when output and input are defined and the statistical techniques employed to implement the concepts are made explicit. This is an important part of the study of productivity, since concept and methods of estimation affect the movement and interpretation of output, input, and the productivity ratio.

With regard to the national product, individualistic welfare criteria generally underlie the distinction between those goods which are final and those which are intermediate in the sense of being consumed in the process of producing final products. Not only consumption goods are included, but also investment goods (net of those required for replacement) since these provide for future personal satisfactions and absorb resources that could be consumed if desired without lowering productive capacity. The controversial element in the national product is the output of government as measured by the cost of the purchased resources.

The official national product estimates of the Department of Commerce include all purchases by government as final product on the grounds that government itself is an ultimate consumer since it does not resell in the market. Kuznets and other critics of this approach maintain that only government services furnished directly to consumers should be counted as final and other services, designed to maintain the social framework and promote business productivity, should be counted as intermediate. The present writer agrees with Kuznets that the Commerce concept is not consistent with welfare criteria, although it does provide a more objective rule for purposes of estimation.

In so far as government intermediate services have risen relative to private output, the Commerce national product estimates have an upward bias from the Kuznets' standpoint. More pertinent, from our standpoint, is the fact that the treatment of government as a consumer precludes the possibility of measuring the productivity of the basic factors hired by government. The producer approach opens the way to estimating the productivity of government factors producing intermediate services in terms of their contribution to private output, and of those factors producing final services in relation to measures of the physical volume of such services. National security services, however, should probably be kept out of measures of economic output. The services of the factors commanded are not directly correlated with individual welfare or with business product, except in an all or nothing way.

The scope of economic activity itself is a moot point. National product estimates are generally confined to goods and services that pass through organized markets, or have close market analogues. This procedure is necessary if there is to be reasonable accuracy of estimation. It should be noted, however, that market productivity measures have a downward bias in so far as productivity has risen more rapidly in business establishments than in households, which is probably the case.

The usual method of converting national product estimates in current prices to physical volumes at constant prices is to divide the current values of the various types of goods and services by appropriate price indexes. This method breaks down in the case of non-standardized products, services of nonprofit institutions and governmental bodies that are not sold in the market, and certain financial services, for which there are no prices in the usual sense. Various methods are suggested for handling these cases; but where it is necessary to fall back on unit cost deflators, as is done by the Department of Commerce for about one-fifth of the total national product, real product and productivity estimates tend to have a downward secular bias.

While the current value estimates of national product, which are tied into periodic censuses, are subject to only a small margin of error, the price deflators are of varying quality and coverage. Thus, the margins of error attaching to real product estimates may be considerable. This is particularly true of cyclical movements which tend to be overstated, since the price deflators which are based on quoted prices tend to show too little cyclical amplitude. It should also be kept in mind by users of real national product and productivity estimates that price and quantity data cannot be adequately adjusted to allow for improvement in quality of products. On this score, productivity estimates have a downward bias.

The inputs corresponding to net national product are likewise net

of intermediate products, reducing to the basic factors of production whose compensation comprises the national income. The factors are of many distinct types within which units are interchangeable and tend to receive identical compensation, but it is convenient to classify them broadly as labor and capital, reflecting the human view and legal distinction between man and property. Labor is defined to include the services of all types of labor, including management. Capital includes all types of tangible productive instruments—natural resources, plant, equipment, and working inventories. Intangible capital in the form of knowledge of the techniques of production and organization cannot be measured directly, but it is largely the accumulation of such capital, when brought to bear on the production processes by the "entrepreneur", that is reflected in the ratio itself.

Labor input may be measured in terms of man-hours employed, weighted by the average hourly earnings of each type that can be estimated separately in order to give effect to the differing qualities in so far as earnings differentials reflect different contributions to product. Changes in quality over time of the individual inputs should not be reflected in the real input estimates if changes in efficiency are to be mirrored in the productivity ratio. The man-hour is not a completely invariant unit in terms of services rendered, however, even when technology is held constant over time. For example, labor services per man-hour probably tended to increase during the early stage of the movement towards a shorter work-week.

If the services of capital are thought of as the net contribution of capital instruments to output, after provision for maintenance and the replacement of instruments, these services may be estimated by weighting the real volume of capital stocks employed by the base-period rate of return, which in effect holds the efficiency of capital constant at the level of technical knowledge prevailing in the base period. This is true since the price deflators applied to capital do not allow for the changing quality or efficiency of the capital instruments.

Studies by Terborgh and others have shown that the services of durable capital instruments tend to decline sharply over the lifetime of the instruments as a result of physical deterioration and obsolescence. Since these declines should be reflected in the input quantities, real estimates should be measured net of depreciation. Even the best of capital stocks should be considered to yield no more than rough approximations to the inputs involved. Nevertheless, it is believed by the writer that estimated trends in capital as well as labor inputs are significant reflections of the underlying reality.

Aggregation of the heterogeneous physical output and input series involves two problems: the type of value weights to use, and the base-period as of which the relative values are chosen. For production

measures, the appropriate weights are relative factor costs, which indicate the relative quantities of resources absorbed by the various products. If factors of the same type are priced uniformly, the appropriate weights for the inputs are their prices, which reflect their relative contributions to product under equilibrium conditions. Using these weights, we are in effect comparing what the outputs of a given period *would* have cost if technology had remained the same as in the base-period with what they actually did cost in the given period in terms of quantities of resources absorbed valued at base-period factor prices.

In practice, market prices must generally be used to weight outputs. These deviate from ideal factor cost weights in so far as indirect business taxes do not approximate the value of intermediate services furnished by government, and to the extent that imperfect competition and disequilibrium distort factor prices in alternative uses. Productivity measures are affected only to the extent that the distortions are not distributed in random fashion but give an unduly heavy weight to the series that are increasing (declining) more than average.

Relative prices or factor costs of products change over time as a result of changes in relative factor prices and as a result of differential changes in productivity. Consequently, the movements of aggregate productivity measures differ somewhat depending on the base-period chosen for weighting purposes. Tests indicate that output tends to increase less the more recent the base period, since productivity generally rises more and prices rise less than average with regard to products whose output has expanded more than average. Thus, recent period prices weight such products less heavily than earlier period prices. This tendency also affects productivity measures except to the extent that it is offset by a corresponding inverse correlation between changes in real factor inputs and in factor prices.

There is no "solution" to the index-number problem. When two periods are compared, it is desirable to use the weights of both periods in order to indicate the divergent results. With respect to time-series, the present writer favors a chain index, so that the weights of each period are contemporary with the quantities. Whatever system is chosen is in the nature of a convention. Fortunately alternative weights do not give widely divergent results, so the direction and general order of magnitude of secular trends are not in doubt.

Despite qualifications, productivity estimates are useful tools for analyzing the role of changes in productive efficiency in economic growth—not only with regard to aggregates but also with regard to the structure of the aggregates in terms of the distribution of resources among the various industries, and the relative prices of products. They may also be used to compare the relative efficiency of different countries, or of different firms or industries, with comparable outputs, in the use

of the resources at their disposal. Comparative analysis of divergent productivity trends or levels as between firms, industries, or nations may also provide clues as to the important causal factors that lie behind the growth of productive efficiency.

Knowledge of past productivity trends and interrelationships with other variables is a necessary prerequisite to economic forecasts. Forecasts are important tools for planning and policy purposes on the part of governments, business firms or nonprofit organizations, and individuals. As our knowledge of productivity trends and interrelationships grows so will our power to adjust to or control the course of economic events. But our ability to analyze, predict, and influence economic variables depends on the meaningfulness and accuracy of our quantitative information. It has been the aim of this dissertation to contribute to the making of better estimates of productivity.

A STUDY OF THE COMPARATIVE SEROLOGY OF SELECTED STRAINS OF ENTOZOIC AMOEBAE

by LOUIS JOSEPH MICHINI*

Numerous efforts to develop a satisfactory serological test for amoebiasis have resulted in considerable disagreement with regard to its efficiency and reliability in clinical application. This study was undertaken to attempt to evaluate on a quantitative basis the serological response of experimental animals to selected amoebic antigens, and using complement-fixation techniques, to attempt to determine the antigenic relationships among morphologically related entozoic amoebae.

Mature rabbits were used for immunization studies. Antigens were prepared from mass cultures of *Endamoeba histolytica*, *E. terrapinae*, *E. invadens*, and *E. moshkovskii*, and standardized by direct counts. These were used both as immunizing and test antigens.

Preliminary complement-fixation tests were a modification of the Kolmer technique. The observed high titers and almost complete cross-reaction of the antigens suggested marked interference on the part of antibacterial antibodies. Antigens were prepared from the associated bacteria of the amoebae cultures and tested against the amoebic antisera. The observed high titers indicated that the great activity was a function of antibacterial activity. All antisera were then adsorbed with the bacterial flora associated with the cultures from which the test antigens were prepared.

The adsorbed antisera were so weakly reactive that the modified Kolmer technique was unsuitable. The more sensitive complement-fixation test using the 50 per cent hemolysis end-point was also too insensitive to be practicable.

It became necessary to adopt a different technical approach based on a factorial design. The traditional transformation used for rectifying the complement dosage response curve (von Krogh alternation formula), though useful for practical work has undesirable mathematical characteristics when the results are to be subjected to statistical analysis. The probit transformation, as used in these studies, is free of the defects inherent in the von Krogh formula.

The complement dosage scale was selected on the basis of preliminary titrations to bridge the range of probit 4.00 to 6.00. Individual dosages were adjusted to correct for the threshold dose. Similarly, dosages of antigen and antiserum were designed to give a logarithmic series from dilutions 10^1 to 10^5 . Zero dosages of antigen and antiserum served as anticomplementary controls for these two reagents.

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The factorial design requires that each dose of antigen, serum, and complement be used in all possible combinations with dosages of the other reagents. With four varieties of serum, four varieties of antigen, and five dosages of each reagent, the final experiment comprises 2000 individual tests. Percentages of hemolysis were transformed to corresponding probits, and the results were subjected to analysis of variance.

The preliminary analysis of variance indicated significant variability among all antigen and serum varieties. Each antigen-serum variety pair was therefore subjected to separate analysis. The significant effects discovered in the individual analyses led to the formulation of multiple regression equations involving the linear response to dosage of complement, serum, and antigen. Because these linear components of regression are not independent a separate equation is necessary for each pair of serum-antigen doses. These equations were then solved for that dosage of complement (K_{50}) which would be equivalent to 50 per cent hemolysis (probit 5.00) in the absence of serum and antigen. The type formula for this solution involves the ratio b'_1/b'_2 (b'_1 is the totality of all regression coefficients not associated with complement; b'_2 , the totality of regression coefficients associated with complement response). In many instances, particularly homologous reactions, b'_2 actually passed through the zero point, i.e., K_{50} became infinite. The significance of this phenomenon lies in the fact that for certain doses of serum and antigen the response curve for the opposite reagent has zero slope, that is, the quantitative reaction is meaningless. This would mean that a complement-fixation test based on a single dosage of serum and antigen is subject to the risk of approaching it not reaching this point with the result that the response in the presence of antigen would not differ from the anticomplementary response of the serum alone, and no test would be possible. This explains why the device of diluting an "anticomplementary" serum and retesting often results in a partially satisfactory test.

The variation in slope of the response curve, dependent as it is on the particular dose of serum and antigen used, indicates the fallacy of basing quantitative estimates of fixation on the curve describing the action of complement in the absence of serum and antigen. The only conclusion that can be reached from these results is that a complement-fixation test for quantitative interpretation must be based on a method which will permit evaluation of this synergistic action. This would suggest that the minimum test set up would consist of two doses of each of the three reagents, plus of course the necessary controlled dosages of antigen and serum. Doubtless such a system could be designed but it is beyond the scope of the present study.

The results obtained suggest certain interrelationships among the

amoebic strains used. At present there is no way in which this can be expressed in quantitative terms, so that there may be minor antigenic components which would be revealed by a more rigorous study. There are, however, at least two distinguishable antigenic components in *E. diamyctba moshkovskii* and *E. terrapinae*, and at least three in *E. histolytica* and *E. invadens*. The existence of these close relationships indicates that caution should be used in the interpretation of results even if a satisfactory complement fixation test for amoebiasis is devised.

ANTIBIOTIC RESPONSE IN *MICROCOCCUS PYOGENES* AND ITS RELATIONSHIP TO PHAGE TYPE AND ENVIRONMENT

by ELIZABETH JANET OSWALD •

The status of the antibiotic-resistant micrococci, particularly *Micrococcus pyogenes* var. *aureus*, has caused a great deal of discussion during the last few years. Facts concerning these organisms have poured into literature at such a rate that the grains of truth sometimes seemed to be lost in a veritable ocean of information. In undertaking this study an effort was made to deal with the several aspects of the problem given separate consideration by others.

Emphasis was placed, first of all on the extent to which specific bacteriophage reactivity is associated with sensitivity and resistance to a number of antibiotics. In the second place, it was of interest to know whether this response and association varied in organisms isolated from differing environments; and, finally, the picture with respect to the response of specific strains to several antibiotics and the effect of the phage and environmental factors on this multiple response was noted.

The coagulase positive strains were given primary consideration in the study because of their pathogenic potential and phage susceptibility. Isolations were made from individuals in three representative environmental groups: *closed*, confined group; *semi-closed*, discontinuously controlled group; and *open*, unconfined group. Information was obtained for each strain as to source, pigment production, coagulase production, mannitol fermentation, and the minimal inhibitory concentration for each of eleven antibiotics. In addition, all coagulase positive strains were phage typed.

In the distribution charts which were prepared, the incidence of the various phage types of *M. pyogenes* together with their antibiotic resistance were shown. By means of these charts it was possible to compare the number of organisms of a given phage type and antibiotic sensitivity occurring in the various environmental groups. Chi-square tests showed significant differences in response between the various phage groups in some of the same environmental samplings, none in others. Chi-square tests also showed that significant differences in response existed between some of the same phage groups in different representative populations, and that significant differences in antibiotic response also existed between the coagulase negative and coagulase

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positive, phage-insusceptible organisms. Phage group incidence by isolation site and population category was noted.

From the differences recorded in the single and multiple responses of organisms of a similar phage group in the various environments, it was apparent that both the external conditions under which an organism lives and propagates, and its reactivity to another external agent, namely bacteriophage, play some part in determining its ability to survive the antagonistic effects of the antibiotic drugs. Analysis of correlation coefficients suggested that certain relationships existed in the multiple response pattern; but these varied from environment to environment. For instance, Group III organisms which were isolated from a hospital population, demonstrated a measurable increase in resistance to several antibiotics for a given increase in penicillin resistance. Group III organisms isolated from a normal group showed the same tendency to a considerably less degree. Organisms displayed an ability to build up resistance to the tetracyclines simultaneously, chloramphenicol was infrequently implicated in resistance, and erythromycin and carbomycin, probably because they are relatively new drugs, were found to be only occasional offenders.

Thirty-six per cent of all Group III organisms studied were resistant to penicillin. In contrast, only 18 per cent of the untypeable and 5 and 10 per cent respectively of Groups I and II were resistant. Perhaps, as has been suggested, the *M. pyogenes* strains susceptible to Group III phages possess a unique facility "for adaptation or genetic change with regard to a variety of stimuli or methods of selection".

The selection and concentration of adaptable forms was shown to occur in a suitable environment. The distribution of these adaptable (antibiotic resistant) forms appeared to relate to some innate ability of the organism as reflected by phage type. Although adaptable forms were shown to exist in every environmental circumstance, it was postulated that they were usually so few in number that, except under conditions specifically favoring their survival, they tended to remain in the minority.

THE EFFECT OF HYPERTONIC GLUCOSE ADMINISTRATION ON CEREBROSPINAL FLUID DYNAMICS IN THE DOG

by LLOYD BENJAMIN WITKIN •

It has long been known that the administration of relatively innocuous hypertonic solutions will produce a diminution in the pressure of the cerebrospinal fluid which is attributable to the increase in blood osmotic pressure, causing a shift in equilibrium between blood and cerebrospinal fluid and a concomitant transfer of the fluid into the blood.

Investigations relating the timing of events between the blood sugar on the one hand with the pressure changes of the cerebrospinal fluid on the other have not been conducted.

The theory of secretion of the cerebrospinal fluid attracted the author's attention. Although experimental work by many authors has been done, the problem is still a controversial one. Experiments in which the rate of outflow of the fluid had been altered by drugs were always met with the objection that the normal fluid dynamics of the brain were seriously altered in the experimental procedure.

A method was devised which seemed to overcome these objections: administration of a dose of hypertonic glucose solution at a standard rate should produce the same alterations in the spinal fluid pressure in a series of control animals. If the choroid plexuses are secretory glands atropine should cause abolition of the fluid's elaboration while pilocarpine should cause a reverse effect.

A series of atropinized animals subjected to the same experimental procedure as the controls should exhibit a greater diminution of the cerebrospinal fluid pressure.

A series of animals treated with pilocarpine should exhibit a lesser diminution of the cerebrospinal fluid pressure.

Approximately thirty male mongrel dogs were used in this study. Anesthesia was effected with pentobarbital sodium.

The femoral artery was exposed unilaterally and cannulated for recording arterial pressure. The femoral vein was exposed on the contralateral side and fitted with a loose ligature to ease blood sampling.

Cerebrospinal fluid pressure was recorded with a spinal fluid manometer. The small bore of the manometer minimized displacement of cerebrospinal fluid. The volume-pressure displacement was only 1.6 microliters per millimeter pressure change.

The spinal needle was placed in the cisterna magna by puncturing

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the occipito-antlantoid ligament. Connection of the system was checked by noting the respiratory and arterial excursions in the pressure and also by the Queckenstedt method of observing a marked rise in the pressure upon compression of the cerebral venous drainage in the neck.

Intravenous glucose administration was carried on through the femoral vein.

Two dogs were used to determine the effect of atropine sulfate (0.1 mg. kg.) and pilocarpine hydrochloride (0.1 mg. kg.) on the cerebral venous pressure and the cerebrospinal fluid pressure. Spinal fluid pressure was read from a needle thrust directly into a lateral ventricle. Cerebral venous pressure was read from a needle in the superior sagittal sinus.

The administration of 3 grams per kilogram glucose (50 per cent) intravenously delivered at the rate of 167 mg./kg. min. was studied. Hematocrit is lowest at the same time that the blood sugar is maximum. These both reached their peak at the termination of fluid administration. A change in blood sugar of 570 per cent was required to effect a hemodilution of 30 per cent. Cerebrospinal fluid pressure began to fall slightly while the glucose was being administered, but its rate of change was greatest beginning at the termination of glucose administration and reached its minimum pressure when the blood sugar was falling and the hematocrit was rising.

The slow intravenous administration of 4 grams per kilogram of 100 per cent glucose at the rate of 45 mg./kg./min. caused a sharp increase in the spinal fluid pressure during the injection period. Even after 7 hours, the pressure was far in excess of the pre-injection pressure.

The intraperitoneal administration of 10 grams per kilogram of 50 per cent glucose caused the blood sugar to rise at a somewhat rapid and constant rate which did not reach a maximum even after 4 hours. In one case spinal fluid pressure continued to drop throughout 3 hours (42 per cent). In another case the pressure reached its minimum in 60 minutes but returned to normal in 135 minutes.

Ten grams per kilogram of 100 per cent glucose administered intraperitoneally produced maximum blood sugar levels in 4 hours. At the end of 7 hours, the blood sugar was near control values. Cerebrospinal fluid pressure dropped in almost a linear fashion with respect to time throughout the 7 hours from control of 120 mm. to minus 15 mm. of isotonic saline.

Neither atropine sulfate nor pilocarpine hydrochloride in doses of 0.1 mg. kg. have appreciable effect on the cerebrospinal fluid pressure or the cerebral venous pressure in the dog anesthetized with pentobarbital.

Six control dogs were treated as much alike as possible experimentally.

They were all given 5 grams per kilogram glucose (50 per cent) intravenously at the rate of 250 mg. kg. min. The curve per cent change in the spinal fluid pressure vs. time was plotted on coordinate paper and the area under the curve between the zero intercepts determined for each animal. These values are in arbitrary units, but the same units are used in all cases and for all groups of animals.

Six dogs treated with atropine sulfate intravenously (0.1 mg. kg.) one hour before beginning the experiment were subjected to exactly the same procedure as the controls.

Six dogs treated with pilocarpine hydrochloride (0.1 mg. kg.) 30 minutes before the start of the experimental procedure were also subjected to the same procedure as the controls.

The data obtained from the three groups of animals is summarized in the following table:

	Area ¹	Time return ² control	Time max. ³ depression	Max. per cent ⁴ decrease	Max. press. ⁵ change
			Control Group		
mean	44.8	118.5	42.8	52.1	48.0
S.D.	14.9	17.1	13.2	7.8	9.1
			Atropine Group		
mean	69.8	139.7	66.5	64.6	58.7
S.D.	23.3	30.5	20.9	12.2	15.2
			Pilocarpine Group		
mean	28.8	103.0	46.5	38.5	36.3
S.D.	5.6	15.3	3.6	5.4	5.9

1 Area under per cent change in spinal fluid pressure curve between zero intercepts—arbitrary unit.

2 Time required for the spinal fluid pressure to return to control level (minutes).

3 Time required for maximum depression of the spinal fluid pressure (minutes).

4 Maximum per cent decrease of the spinal fluid pressure.

5 Maximum pressure change in spinal fluid pressure from control (mm. Hg.).

The mean area under the curve per cent change in cerebrospinal pressure between the intercepts zero per cent of the atropinized animals compared with the control animals is not statistically significant.

cantly different ($t = 2.2$; $p > .05$). The mean area under the curve of the atropinized animals is significantly greater than that of the pilocarpine treated animals ($t = 4.2$; $p < .01$). The area of the control animals is not significantly different from that of the pilocarpine treated animals ($t = 2.3$; $p > .05$).

The mean time required for the spinal fluid pressure to return to zero of the control animals was not statistically significantly different from that of the atropinized animals ($t = 1.5$; $p > .1$). The mean time for return to zero of the pilocarpine treated animals was significantly faster than the atropinized animals ($t = 2.6$; $p < .05$). There was no difference between the mean time for return to zero of the control animals and that of the pilocarpine treated animals ($t = 1.7$; $p > .1$).

The mean time of maximum depression of the spinal fluid of the control dogs was significantly less than that of the atropinized dogs ($t = 2.4$; $p < .05$). The mean time of maximum depression of the atropinized dogs was not significantly different from that of the pilocarpine treated dogs ($t = 1.9$; $p > .05$). The mean time of maximum depression of the control animals was not different from that of the pilocarpine treated animals ($t = 0.7$; $p > .5$).

The maximum mean per cent decrease of the cerebrospinal fluid pressure of the control animals was not significantly different from that of the atropinized animals ($t = 2.1$; $p > .05$). The maximum mean per cent decrease of the atropinized dogs was significantly greater than that of the pilocarpine treated dogs ($t = 4.8$; $p < .01$). The maximum mean per cent decrease of the control dogs was greater than that of the pilocarpine treated dogs ($t = 3.5$; $p < .01$).

The maximum absolute per cent change of the spinal fluid pressure of the control dogs was not significantly different from that of the atropinized dogs ($t = 1.5$; $p > .1$). The mean maximum absolute pressure change of the atropinized dogs was not different from that of the pilocarpine treated dogs ($t = 2.0$; $p > .05$). The mean maximum absolute pressure change of the control dogs was significantly different from that of the pilocarpine treated dogs ($t = 2.6$; $p < .05$).

It is clear from the data presented that changes in osmoticity of the blood and changes in cerebrospinal fluid pressure do not occur concomitantly during intravenous administration of glucose. Peaks of maximal glucose concentration were followed by a considerable delay before maximum changes in the cerebrospinal fluid pressure. When large amounts of glucose were given intraperitoneally, the dehydrating action on the brain was apparently due to two factors: (1) the dehydrating action of the glucose as evidenced by the hematocrit and (2) the increased osmoticity of the blood.

The data obtained from the three groups of animals in which glucose was administered at a constant rate is most interesting. In so far as rate of elaboration of the cerebrospinal fluid is concerned it is reasonable to expect that the atropine group represents minimal and the pilocarpine group maximal elaboration. The control group is intermediate.

The statistical evaluation of the material is most striking when the atropine group is compared with the pilocarpine group.

The area under the curve per cent change in spinal fluid pressure is the best index of all the other parameters.

Since the areas above mentioned of the atropine group when compared with the pilocarpine group are statistically significantly different, the conclusion must be drawn that atropine diminished, while pilocarpine enhanced the elaboration of the cerebrospinal fluid, i.e., the fluid is elaborated by an active secretory process.

THE FATE OF SYMPATHOMIMETIC PHENYLISOPROPYLAMINES

by JULIUS AXELROD*

Although sympathomimetic amines with a phenylisopropyl nucleus have found extensive therapeutic use, little is known about their fate in the organism. Studies in the past on the fate of these drugs have been hampered by the lack of specific and sensitive methods for their estimation in biological materials. Furthermore, the information available concerning the disposition of these important drugs in various animal species is incomplete and conflicting. For this reason, investigations were undertaken to devise suitable methods for the estimation of sympathomimetic phenylisopropylamines and to study their fate in the body.

This dissertation describes methods for the estimation of amphetamine (Benzedrine), p-hydroxyamphetamine, methamphetamine, ephedrine, norephedrine (Propadrine), p-hydroxyephedrine (Suprifen), and p-hydroxynorephedrine in biological material. Techniques such as counter-current distribution, selective use of organic solvents, and paper chromatography have been used in devising these methods. The development of methods for the estimation of sympathomimetic phenylisopropylamines made it possible to study the fate of these drugs *in vivo* and *in vitro* in a number of animal species.

On the basis of the studies that have been described in this dissertation the following pathways of metabolic transformation are suggested for amphetamine, p-hydroxyamphetamine, and methamphetamine. The main route of metabolism of d-amphetamine in the dog involves hydroxylation to p-hydroxyamphetamine, a potent pressor agent. Hydroxylation is only a minor metabolic pathway in the case of l-amphetamine. The differences in the metabolism of the optical isomers of amphetamine are presumably due to the presence of an enzyme which can deaminate l-amphetamine more readily than d-amphetamine. Considerable amounts of both compounds are excreted unchanged. Both d- and l-amphetamine disappear from the plasma at approximately the same rate. In the dog, amphetamine disappears slowly as compared to its hydroxylated metabolite, suggesting that in this species the major pharmacological effect is due to the parent compound. When p-hydroxyamphetamine is administered it appears in the urine partly free and partly conjugated.

After the administration of methamphetamine to a dog, about half of the compound is demethylated to amphetamine, part of which is hydroxylated to p-hydroxyamphetamine. About 20 per cent of methamphetamine is excreted unchanged. From these observations, it would appear that the pharmacological action of methamphetamine would be mediated through its metabolic product, amphetamine.

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Marked differences in the metabolism of d-amphetamine were observed in various species. Dogs and rats hydroxylate considerable amounts of the drug, while rabbits almost completely metabolize amphetamine, apparently by deamination.

Studies *in vitro* suggest that amphetamine is deaminated to phenylacetone and ammonia in the presence of reduced triphosphopyridine nucleotide and oxygen by an enzyme system which is localized in the microsomal fraction of the rabbit liver. A reservoir of reduced coenzyme is maintained by TPN-dehydrogenases and their oxidizable substrates present in the soluble supernatant fraction. The role of reduced TPN in an enzyme system catalyzing an oxidative reaction is not understood. The enzyme which deaminates amphetamine differs from other deaminating enzymes such as amine oxidase, D-amino acid oxidase, L-amino acid oxidase, and glutamic acid dehydrogenase with respect to its substrate specificity, cellular localization, and cofactor requirements.

A heat labile factor which inhibits the deamination of amphetamine and a heat stable activating factor were found to be present in the liver microsomes. The presence of these factors may explain in part the species differences in the metabolism of amphetamine.

A number of sympathomimetic amines are deaminated by the TPNH-dependent enzyme. Amines having a phenylpropylamine or phenylbutylamine structure are extensively metabolized and the enzyme shows relative specificity toward the levo isomers. Phenolic amines, phenylethylamines, and aliphatic amines are deaminated slightly or not at all.

Studies on the metabolism of ephedrine have shown that the main route of metabolism of this drug in the dog involves rapid demethylation to norephedrine, a relatively stable and potent pressor agent. It would appear from these observations that the activity of ephedrine is mediated to a considerable extent through its metabolic product, norephedrine. Minor routes of metabolism involve hydroxylation of both ephedrine and norephedrine to yield the corresponding p-hydroxy derivatives, both of which are potent pressor agents. Norephedrine is relatively stable in the dog and is excreted in the urine mainly unchanged.

There are considerable differences in the metabolism of ephedrine in different species. In the dog and the guinea pig, demethylation constitutes the major route of biotransformation. The rat, on the other hand demethylates ephedrine slowly, and considerable amounts of the drug are excreted both unchanged and as hydroxylated derivatives. The rabbit excretes only negligible amounts of ephedrine and norephedrine.

Studies on the tissue distribution of amphetamine, ephedrine, and norephedrine showed a similar pattern of tissue localization. These drugs were found to be concentrated in organ tissues to a considerable

extent with negligible localization in fat and bile. The high concentration of the amines found in the brain and cerebrospinal fluid would suggest that there is little hindrance to their passage across the blood-brain barrier.

An enzyme system which demethylates ephedrine to norephedrine and formaldehyde is described. This enzyme system is localized in liver microsomes and requires both reduced triphosphopyridine nucleotide and oxygen. A rabbit liver microsomal preparation also metabolizes ephedrine by pathways other than demethylation. Since it has been shown that many sympathomimetic amines are deaminated in the rabbit liver by a TPNH-dependent microsomal enzyme system, it appears likely that ephedrine also could be deaminated by this enzyme system.

The TPNH-dependent enzyme system can demethylate other sympathomimetic amines. The enzyme system could demethylate substrates possessing a phenylisopropylamine nucleus, but not those with a phenylethylamine structure. Sympathomimetic amines with hydroxy groups on the aromatic nucleus are demethylated slightly or not at all.

The species differences in the metabolism of ephedrine can be explained, in part, by the activity of the TPNH-dependent enzymes demethylating and deaminating sympathomimetic amines. When ephedrine or norephedrine are administered to the rabbit, both compounds are completely metabolized. The metabolism of these drugs is presumably carried out by enzymes which can demethylate ephedrine and deaminate norephedrine. The activity of the enzyme which deaminates norephedrine is negligible in the dog, so that the demethylated ephedrine is excreted unchanged. In the rat, the activity of the enzyme which demethylates ephedrine and deaminates norephedrine is negligible, so that administered ephedrine is excreted unchanged or as p-hydroxyephedrine.

From the results obtained in this investigation, it can be concluded that sympathomimetic phenylisopropylamines are metabolized by a variety of metabolic pathways including demethylation, hydroxylation, conjugation, and deamination, and that there are considerable species variations in the biotransformation of these drugs.

THE INFLUENCE OF PYRIMIDINES ON THE
PROPAGATION OF POLIOMYELITIS VIRUS IN
TISSUE CULTURE

by CHARLOTTE HESS KNOX.

One hundred eighty-four compounds were tested for their influence on the growth of poliomyelitis virus in tissue culture. By microscopic examination of the tissue culture for drug toxicity and tissue degeneration characteristic of viral proliferation, a therapeutic index, i.e., the ratio of the highest concentration of drug non-toxic to tissue to the lowest concentration inhibitory to viral growth, was determined and it 16 or more met the selected criterion for effectiveness.

Of the chemicals investigated, 45 were found to inhibit viral growth in cultures of monkey kidney tissue, when tested with 100 TID₅₀ of type 2 virus added simultaneously with the drug. These chemicals were then studied for their influence when the tissue was infected 24 hours before the addition of drug with 50 TID₅₀ of type 2 virus. Thirty-nine of the chemicals maintained a therapeutic index of eight or more when tested in pre-infected testicular tissue. Also the minimum inhibitory concentration was determined when tissue was pre-treated with drug for 24 hours before the addition of 50 TID₅₀ of type 2 virus.

The chemicals active in pre-infected testicular tissue were then studied in monkey kidney cultures infected with 10 TID₅₀ of type 2 virus added simultaneously with the drug. Eight chemicals, thionuracil, 5-methylthiouracil, 4,6 diamino-5-nitro-2-thio pyrimidine, 2 thio-4-phenyl-6-oxo-pyrimidine and 2,4,5,6 tetramino pyrimidine, hypoxanthine, n-butyl-ethyl barbituric acid, and 1 methyl-butyl-ethyl barbituric acid were found to be effective, with a therapeutic index of two or more, and attempts were made to elicit their mode of action.

The influence of the eight chemicals on the growth of three types of virus was compared in both cultures of monkey kidney and testicular tissue. In kidney cultures the chemicals displayed relatively the same level of activity against the three types of virus while in testicular cultures, higher concentrations of thiouracil, 5-methyl thiouracil, and hypoxanthine were necessary to inhibit type 1 virus than types 2 or 3. In a tissue culture system, it is possible that the virus has different possible sites of action with a therapeutic index of two or more, and attempts were made to elicit their mode of action.

In a tissue culture system, it is conceivable that there are several possible sites for a chemical to act in influencing viral growth. The chemical may act directly on the virus, rendering it inert; directly on the tissue, altering the tissue in such a manner as to indirectly prevent viral growth; and, finally, acting through the tissue to directly influence viral synthesis.

When the direct virucidal action of drug on virus was investigated *in vitro*, four of the chemicals, 5-methylthiouracil, 2-thio-4-phenyl-6-

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oxy pyrimidine, *n*-butyl ethyl-barbituric acid, and 1-methyl-butyl-ethyl-barbituric acid were found to directly inactivate the virus in the test system. Except for 5-methylthiouracil, where inactivation occurred after the first hour, the virus was inactivated within the first hour of contact with the remaining chemicals, and inactivation was complete except with *n*-butyl ethyl-barbituric acid.

When studies were undertaken to determine if the drug had a direct effect on tissue, it was found that concentrations of chemical above the minimum inhibitory level did not prevent the growth of undeveloped testicular tissue. When testicular tissue, pre-treated with inhibitory concentrations of drugs, was tested for its ability to support viral growth, the tissue treated with hypoxanthine was the only one found to support virus as the untreated controls. The inability to remove all traces of chemical from the cultures may account for the inability of the treated tissue to support viral proliferation.

In an effort to determine the manner in which the inhibitors were influencing viral synthesis, reversal of inhibition was attempted with 28 naturally occurring substances. Although none of the metabolites reversed the inhibition produced by 2-thio-4-phenyl-6-oxy-pyrimidine or by 4,6-diamino-5-nitro-2-thio pyrimidine, antagonists were found in a limiting range of activity for the remaining inhibitors. Uracil antagonized thiouracil. Thiamine antagonized 5-methylthiouracil, and cytidine, cytosine, and guanosine reversed hypoxanthine. Cytidine and thymine antagonized 1-methyl-butyl-ethyl-barbituric acid; adenine, arginine, glycine, serine, and thymidine reversed the inhibition produced by *n*-butyl-ethyl-barbituric acid; and glycine antagonized 2,4,5,6-tetramino pyrimidine. As none of the metabolites were active over a range greater than four, competitive inhibition studies were not undertaken.

The growth curve of the virus, both alone and in the presence of inhibitors, was studied in monkey testicular and kidney cultures. In kidney cultures with drug concentrations approaching the maximum non-toxic level, viral growth was delayed 24 or more hours and then approached untreated cultures, with a peak titer one to 4.5 logs less than that of controls obtained by 48 hours incubation. In testicular cultures in drug concentrations covering the inhibitory range, only at the minimum concentrations of 5-methylthiouracil, hypoxanthine, and 2,4,5,6-tetramino pyrimidine did the occurrence of virus approach that of controls. With thiouracil and *n*-butyl-ethyl-barbituric acid virus was present but in decreased amounts. With higher drug concentrations, detectable amounts of virus were not present up to 12 days incubation. Thus it appears, in kidney cultures, viral growth is delayed 24 hours or more, while in testicular cultures, viral proliferation is completely suppressed in the presence of high concentrations of inhibitors.

THE STIMULATION BY GLUTAMATE OF SUCCINATE,
FUMARATE, AND MALATE OXIDATION IN BRAIN
TISSUE

by ENNIS CECIL LAYNE, JR. •

Systematic study by many investigators has led to the establishment of the "citric acid cycle" reaction sequence as a major pathway for the ultimate oxidation in tissue of carbohydrate, fat, and protein. It is further known that aerobic oxidation by means of the citric acid cycle may be linked with an esterification of inorganic phosphate. The importance of these topics

The importance of these findings to an understanding of the intermediary metabolism of animal tissue is evidenced by the fact that the mitochondrial unit of the cell, in addition to possessing specific metabolic characteristics by which the unit of one cell can readily be distinguished from the other, uniformly and regardless of source, carry out the citric acid cycle and related processes such as oxidative phosphorylation and oxygen transport.

Krebs has suggested, however, that the citric acid cycle, in addition to occupying a key position in the sequence of oxidative catabolism, has yet another major function; namely, the provision of intermediates for metabolism, and there is a recent accumulation of supporting evidence. In particular, a number of degradative pathways for amino acids have been discovered recently which require a transamination with alpha ketoglutarate or oxaloglutarate as one of the steps.

A more subtle question, however, is raised by the recent report of Beaman that glutamate, the most prevalent amino acid in animal tissue, stimulates the oxidation of malate, fumarate, and succinate by brain homogenates, probably by means of a transamination with oxaloacetate. One might speculate that any supplementary reaction which influences the metabolic rate, or which alters the course of metabolism of citric acid cycle intermediates (succinate, fumarate, malate, oxaloacetate, α -ketoglutarate, etc.) would exert a profound effect on the utilization of foodstuffs and the consequent production of useful energy. Since glutamate occurs at a steady state in

Since it seemed desirable to study the effect of L-glutamate on citric acid cycle oxidation and phosphorylation in rat brain homogenates, with special emphasis on the mechanism by which glutamate influences the metabolism of succinate, fumarate, and malate. The reagents used were:

Materials which could not be purchased were synthesized from tissue following published directions. Estimation of

[illegible]

metabolite concentrations was affected by the application of standard recognized analytical procedures.

The first stage of the investigation involved the confirmation of the stimulatory effect of glutamate on succinate metabolism in tissue, and the establishment of test conditions prior to mechanism studies. It was found that the addition of glutamate to rat brain homogenate (supplemented with adenosine triphosphate and cytochrome c) respiring in succinate had little effect on oxygen consumption or citric acid formation, but caused a striking stimulation (approximately four and one-half times the control) in total keto-acid formation. Subsequently, alpha-ketoglutaric acid was shown to be the main product of the stimulated keto-acid formation. The enhanced alpha-ketoglutarate formation and oxygen consumption by brain tissue is potentiated by the inclusion in the reaction mixture of diphosphopyridine nucleotide and adenosine triphosphate, but not cytochrome c. Dialysis of rat brain homogenates before incubation leads to a 195 per cent stimulation in alpha-ketoglutarate formation by the glutamate-succinate mixture. This is shown not to arise by virtue of an increased ability to oxidize alpha-ketoglutarate. Dialysis of rat liver homogenates, in which succinate oxidation was also shown to be stimulated on the addition of glutamate, leads, on the other hand, to a decrease in the stimulatory action of glutamate.

The next step in the investigation was to establish the mechanism whereby glutamate action occurs. The oxygen consumption and the stimulation of alpha-ketoglutarate formation by dialyzed brain homogenates supplemented with adenosine triphosphate and diphosphopyridine nucleotide, was shown to be dependent on both glutamate and succinate concentrations. Of special interest is the finding that the stimulated alpha-ketoglutarate formation occurs at glutamate concentrations well below the physiological level.

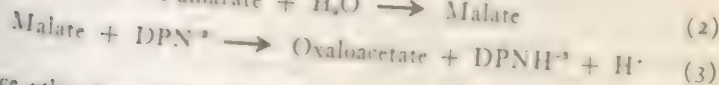
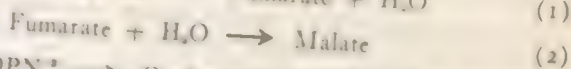
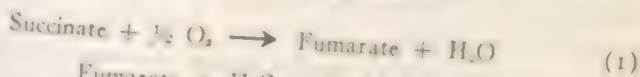
Evidence was obtained that the glutamate stimulation of succinate oxidation extends also to fumarate or malate oxidation. The inclusion of potassium malonate or potassium cyanide had no effect on alpha-ketoglutarate formation by mixtures of glutamate and fumarate or malate, but abolished the stimulation where succinate was substrate. Since both malonate and cyanide are known to inhibit succinoxidase action, this demonstrates that succinate is, in the uninhibited system, first enzymatically oxidized to fumarate, which subsequently reacts.

Malate is, in the presence of diphosphopyridine nucleotide, oxidized by malic dehydrogenase to oxaloacetate as evidenced by increased ultraviolet absorption at 340 millimicrons, a characteristic of reduced diphosphopyridine nucleotide. That the ultraviolet absorption observed is indeed due to reduced diphosphopyridine nucleotide formation was demonstrated by adding pyruvate and a crystalline lactic dehydrogenase

preparation. An immediate and precipitous decrease in ultraviolet absorption was observed.

Two arguments were used to show that fumarate is initially hydrated to malate: first, the fact that glutamate-malate mixtures consistently produce more alpha ketoglutarate than do glutamate-fumarate mixtures, implies that malate is proximal substrate; and second, reduced diphosphopyridine nucleotide is also formed when fumarate is substrate, and the rate of formation in glutamate-fumarate mixtures is identical with the rate obtained with glutamate and malate.

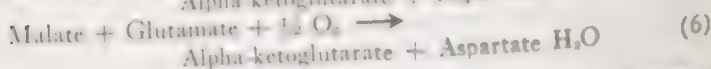
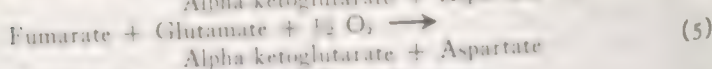
Succinate, fumarate, and malate, stimulated by glutamate, have been shown, therefore, to be oxidized to oxaloacetate along the normal citric acid cycle pathway according to the following reactions:



Since other investigators have shown by means of isotope experiments that brain, unlike liver, incorporates little or no carbon dioxide into fumaric, succinic, malic, oxaloacetic, or alpha-ketoglutarate acid, it seemed probable that the alpha ketoglutarate formed by our preparations was derived from glutamate. If glutamate were oxidatively deaminated, ammonium ion would be expected to accumulate. No increase, however, in the amount of ammonia present was observed as the reaction progressed. The possibility was considered that ammonia is formed, but that in the presence of the large amounts of glutamate, adenosine triphosphate, and magnesium ion added to our preparations, it is acted on by glutamine synthetase to produce glutamine. Glutamine assays in a number of experiments revealed, however, no concentration change over that of the control. These results imply that the glutamate effect involves transamination with some alpha-keto acid and that the alpha-ketoglutarate formed is derived from glutamate as a product of the transamination.

Since glutamic-oxaloacetic acid transaminase is known to be present in brain tissue in greater concentration than glutamic-pyruvic acid transaminase, it was assumed that glutamic acid stimulated the metabolism of succinic, fumaric, and malic acids by transaminating with the oxaloacetic acid produced to yield alpha-ketoglutaric and aspartic acids. Chromatograms of the reaction mixture showed that aspartic acid is indeed produced.

The overall reactions for the aerobic stimulation by glutamate of the oxidation of succinate, fumarate, and malate are, therefore:



As a test of reaction 5, above, a mixture of glutamate and fumarate was incubated with supplemented rat brain homogenate. Before and after incubation, aliquots were analyzed for glutamine, malic, aspartic, fumaric, succinic, glutamic, and keto acids. Ninety eight per cent of the added substrate was recovered as reaction products, and as predicted by Equation (5), above, the molar amount of glutamate used was equal to the aspartate formed.

Since normal citric acid cycle oxidation is associated with a concomitant esterification of inorganic phosphate, experiments were carried out to ascertain what effect glutamate stimulation has on coupled phosphorylation. A consistent uncoupling action was observed. Although the inclusion of inorganic phosphate in the reaction mixture is necessary for oxygen uptake, it is not essential for stimulated alpha ketoglutarate formation.

The action of manganous and aluminum ions was tested since both catalyze the non-enzymatic decarboxylation of oxaloacetic acid. Manganous ion inhibits alpha-ketoglutarate formation as expected, but aluminum ion is stimulatory. This effect is at the malic dehydrogenase level since both are without effect on glutamic-oxaloacetic acid transaminase.

The additions of glutamate to rat brain homogenate metabolizing succinate, fumarate, or malate led to a consistent increase in alpha-ketoglutarate formation, but the influence on oxygen consumption varied from day to day.

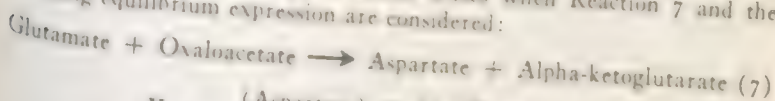
Although rat brain preparations were used in the mechanism studies, the glutamate stimulated alpha-ketoglutarate formation activity is present in other tissues, being greatest in kidney cortex, intermediate in brain, and least in liver.

The mechanism, therefore, by which glutamate stimulates succinate, fumarate, and malate oxidation in brain involves a transamination with the oxaloacetate formed as a result of citric acid cycle activity. The driving force for the process is the oxaloacetate removal which through mass action stimulates further citric acid cycle oxidation of the added succinate, fumarate or malate. Since the alpha ketoglutarate produced in our system is presumed to be itself oxidized by the intact cell, the net effect is the conversion of glutamate to aspartate with the evolution

of carbon dioxide and water—apparently with concomitant uncoupling of oxidation and phosphorylation.

The finding that the reactions occur at glutamate concentrations well below the normal physiological range in brain would indicate that the mechanism might be active in the intact organ and that the brain could thus manufacture relatively large quantities of aspartate. Because of the lack of a specific analytical method for aspartate, the normal level in brain is still uncertain. However, it has been reported that insulin shock in rats is accompanied by a decreased brain concentration of glutamate and an elevated aspartate concentration, as would be predicted from the data presented here.

A possibility that the transamination mechanism might be partially regulatory of citric acid cycle activity arises when Reaction 7 and the resulting equilibrium expression are considered:



$$K_{eq} = \frac{(\text{Aspartate}) \times (\alpha\text{-Ketoglutarate})}{(\text{Glutamate}) \times (\text{Oxaloacetate})}$$

If in the course of metabolism the concentration of acetylcoenzyme A tends to decrease, condensation with oxaloacetate to yield citrate would be retarded and the oxaloacetate level might momentarily tend to rise. Glutamate present would then transaminate more rapidly to yield aspartate and alpha-ketoglutarate. The transamination equilibrium would require that in the presence of a low glutamate and high aspartate and alpha-ketoglutarate concentrations, the oxaloacetate level must be elevated. This would be possible since the additional alpha-ketoglutarate produced would push the oxidation of malate. An increased oxaloacetate concentration, presumably, would permit further condensation with acetyl-coenzyme A to yield citrate, thus maintaining citric acid cycle activity, but at a lower acetylcoenzyme A concentration. Any increase in the coenzyme A formation would then tend to decrease the oxaloacetate level and reverse the transamination until a normal situation again exists.

In addition to the one suggested here, other regulatory systems probably exist which operate through mass action. Whereas the effect of any one is undoubtedly limited in magnitude, the combined action of several might, to a great extent, account for the observed resistance of living matter to rapid changes in environment.

AN INVESTIGATION OF FACTORS IN CULTURE SUPERNATANT WHICH LIMIT THE GROWTH OF *BRUCELLA SUI*S

by FREDERIC ADAMS LEONARD*

It has been known for many years that if broth cultures of bacteria are filtered or centrifuged to remove cells, and the filtrates are re-inoculated with the same or different species of bacteria as the original inoculum, significantly less growth is obtained in the filtrates than in the fresh medium. This is not true for all bacteria examined under these conditions, but, in general, it has been accepted that the culture filtrates will not support growth, or at least growth equal to that obtained in fresh medium.

During investigations of the nutrition and metabolism of *Brucella suis* strain PsIIIk it was observed that filtrates or supernatants of cultures of certain ages would not support growth if re-inoculated with fresh cells of *B. suis*. To the best knowledge of the writer, this phenomenon had not been demonstrated previously with a member of the genus *Brucella*. Several explanations could be advanced to account for the failure of the inoculum to multiply, but data were lacking as to the actual causes. It was believed, therefore, that more precise information regarding this phenomenon would be a definite contribution to the body of knowledge concerning the metabolic activities of *Brucella*, and for that reason, an investigation was made of some factors limiting growth of the organisms in culture supernatants.

This study was approached from two directions. First, it was considered that the accumulation of toxic metabolites in the culture medium might be inhibiting growth of the new inoculum, and second, it was considered that a depletion of nutrients during growth of the first population limited the growth of the new inoculum.

The PsIIIk strain of *B. suis* used throughout the study had morphological and physiological properties typical of *B. suis* as described in the 6th edition of Bergey's *Manual of Determinative Bacteriology*.

A casein partial hydrolyzate (CPH) was the basic component of the standard medium used. CPH was prepared by hydrolyzing 100 grams of casein with dilute sulfuric acid at 121 C. for 2 hours, neutralizing the acid hydrolyzate with 10 N sodium hydroxide, removing the acid-insoluble humin fraction by filtration, and diluting the filtrate to 1 liter. This 10 per cent stock solution was added to basal media in amounts to give the desired percentage of CPH. The growth media employed were (1) standard CPH medium composed of 1 per cent CPH, 1 per cent glucose, and 0.25 per cent autolyzed Yeast-75; (2)

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double-strength CPH medium; (3) de-ionized CPH medium (DCPH) whose composition was the same as the CPH medium except that the casein hydrolyzate was de-acidified using an anion exchange resin, Amberlite IR4B, instead of neutralizing with sodium hydroxide; (4) modified tryptose broth; and (5) synthetic medium. The media were sterilized by autoclaving at 121 C., filtration, or steaming intermittently for 2 days, depending on the nature of the media. All media were inoculated with approximately 10^8 cells per ml. and incubated at 37 C. with constant agitation for desired periods of time. Growth was measured by plate counts or by reading the turbidities of cultures diluted 1:10 with water in a Model 9 Coleman Nephelo-Colorimeter.

Preliminary experiments showed that supernatants obtained from cultures 24-144 hours of age inhibited the growth of the inoculum, and that growth in supernatants from 6-18 hour old cultures was reduced. Furthermore, continued incubation of these inoculated supernatants did not promote growth, nor did increasing the size of the inoculum from 10^8 to 10^9 cells per ml. overcome the inhibition.

Experiments designed to show whether or not toxic metabolites were present in supernatants were conducted. Supernatant from cultures 72 hours of age were concentrated 5 fold and added to antibiotic assay cylinders inserted into CPH or tryptose agar seeded with *B. suis*. After incubation, no zones of inhibition surrounding the assay cylinders were observed, indicating that under the experimental conditions, no diffusible growth-inhibiting substances were present in the supernatants.

Fresh CPH and 72 hour supernatant were saturated with solid ammonium sulfate at 5 C., the precipitate collected, dialyzed free of salts, and added to standard CPH medium to test the effects of this fraction on the growth of *B. suis*. The fraction from CPH stimulated some additional growth over that obtained in the control standard CPH medium, but the fraction from the supernatant neither stimulated nor inhibited growth. It was concluded that if culture supernatant contained toxic substances, they were not present in the ammonium sulfate-precipitated material.

In other experiments, cells of *B. suis* were added to solutions of the components of CPH medium—CPH, glucose, Yeast-75, and water to determine if *B. suis* would release toxic substances into the components. The mixtures were incubated for 2 weeks at 37 C. Extensive decreases in the viable cell counts in all media components were measured, but growth was reduced only 30 per cent in an inoculated complete medium. The medium components and cells were centrifuged and the clear supernatants combined with other supernatant media components or fresh components in standard amounts. After inoculation and incubation of the combinations, no evidence was found of toxic metabolites since growth in the "used" components was nearly equal to that obtained

in fresh standard medium. However, there was no growth in the supernatant from complete culture media. In several combinations containing used Yeast-75 supernatant, growth was reduced, but could be improved by the addition of thiamin and niacin, indicating a nutrient deficiency rather than a toxicity of the supernatants.

Attempts to reduce the inhibitory effects of supernatant by diluting with saline or fresh medium were unsuccessful.

Supernatants fortified with glucose and Yeast-75 singly and in combination supported scant growth. When the amino acids found in casein were added individually to supernatants fortified with glucose and Yeast-75, no improvement in growth was noted, but a combination of glycine, serine, cystine, and tryptophan stimulated some growth. Supernatants fortified completely with fresh CPH, glucose, and Yeast-75 to levels initially present in standard medium supported growth equivalent to only 60-75 per cent of the fresh control medium. Equal growth could be obtained by the further addition of twice the normal amounts of yeast or CPH. Fortifying supernatants in this manner created a problem relative to the selection of a standard control medium. The normal ratios of media components in fresh medium were disrupted by the growth of the organisms in the first incubation period and were further altered by the addition of more of any one of these components to supernatants. In order to have a common basis for comparison throughout the entire study, the control medium for all experiments involving standard CPH medium supernatants was standard CPH medium and not the fortified medium.

Other growth media were tested for the ability of their supernatants to support growth of *B. suis*. No growth was obtained in 72-hour supernatants from synthetic medium, tryptose medium, or DCPH medium, indicating that the inability of the cells to multiply in culture supernatants was not peculiar to standard CPH medium alone. After these supernatants were fortified with equal volumes of fresh double-strength corresponding media, growth equivalent to that obtained in their fresh media was obtained except in the case of the DCPH medium. Further work showed, however, that if the supernatant from CPH medium were concentrated 2-fold to put it on the same basis as it had been used in previous experiments, and this concentrated form diluted with an equal volume of double-strength fresh medium, growth was reduced to about 60-75 per cent of the control, again, indicating an inhibition by the supernatant.

As suggested by several references in the literature, CPH was dialyzed against water and the dialyzate concentrated to the initial volume of the undialyzed CPH. The non-dialyzable components inside the dialysis bag had little nutritional value for *B. suis* when substi-

tuted for CPH in standard medium, but the dialyzate supported growth nearly equivalent to undialyzed CPH. Mixtures of the dialyzate and residue, however, supported significantly better growth than did undialyzed CPH. Chemical analyses of CPH, and the dialyzate and residue from CPH indicated that the differences in amount of growth obtained in media made from undialyzed CPH or in dialyzed CPH could not be accounted for on the basis of differences in total solid, salts, or the distribution of nitrogen fractions in these materials. Analyses of fresh CPH medium and a 72-hour culture supernatant showed that approximately 50 per cent of the total nitrogen in the medium disappeared. Approximately 30 per cent of the peptides (measured as biuret protein) and 80 per cent of the available amino nitrogen disappeared during the 72 hours of incubation of cultures of *B. suis*.

Analyses of CPH medium using various techniques of one-dimensional paper chromatography showed the presence of glycine, glutamic acid, aspartic acid, tyrosine, histidine, either isoleucine or phenylalanine, alanine, an unidentified spot, and a large smeared spot presumed to be peptides near the point of origin. Analyses of culture supernatant showed nearly complete disappearance of glycine, glutamic acid, and aspartic acid, and substantial decreases in the peptide spot, alanine, and the unidentified spot.

Further investigations as to why the mixture of dialyzate and residue supported better growth than undialyzed CPH in media showed that an inhibitory substance in fresh CPH was absorbed by the cellophane bags. If these bags were cut up and placed in fresh CPH medium, the mixture would not support any growth. If *Bacteriophage* were substituted for CPH in the dialysis experiments no inhibition of growth was noted in medium to which dialysis bags were added. Growth was noted in medium to which unused dialysis bags were added, but the inhibition noted was attributed to reduced agitation and aeration in the mixtures due to the volume of the mixed cellophane, although the obvious possibility that the unused bags themselves were inhibiting growth cannot be eliminated. Attempts were made to elute this substance from the cellophane but were not successful.

A survey of the literature relating to this problem revealed that the theories advanced to explain the limitation of bacterial growth in fresh medium and in culture filtrates or supernatants included (1) depletion of nutrients, (2) the accumulation of toxic end products of metabolism, and (3) physicochemical changes in the medium. Although these factors were taken by various investigators on the issue of why culture filtrates would not support growth, the data cited usually did not indicate which nutrients were involved, nor the nature of inhibitory

substances produced by the microorganisms. In this study, the data indicated that lack of growth in supernatants was due primarily to the absence of glucose and depletions of the Yeast-75 and CPH components of the medium. The possible role of an inhibitory substance in fresh CPH is considered, although it is believed that the latter substance is of secondary importance to the depletion of nutrients. The absence of growth in media containing used cellophane bags represents the effect of a large proportion of the inhibitory substance present in 10 per cent CPH on *B. suis*. Therefore, in standard CPH medium which would contain theoretically only 10 per cent of the amount in the CPH stock, the effect of this inhibitory substance would be reduced accordingly. However, during growth of the cells in which levels of nutrients are being depleted, the effect of this substance in casein may become more pronounced, and might be sufficient to inhibit growth somewhat even when fresh nutrients are added.

STUDIES ON THE INTERFERENCE PHENOMENON IN MIXED INFECTIONS WITH *BRUCELLA SUI* AND *CORYNEBACTERIUM BURNETII*

by LEONARD ALOYSIUS MIKA*

For a number of years evidence has accumulated to reveal that an infection of a host with one agent may lead to a refractory state with respect to infection by another unrelated organism. This so-called "interference phenomenon" in mixed infection studies has aroused considerable interest among many investigators because of its theoretical and practical implications. In clinical medicine, it is possible that interference effects may find application in prophylaxis and therapy. The elucidation of "interference" may also add materially in clarifying unknown facets in the pathogenesis of many infectious diseases.

In addition to the foregoing considerations it was the epidemiological report of Lennette *et al.* (1952) which gave impetus to this investigation. While testing serums of 451 persons with positive *C. burnetii* complement-fixation titers they detected *Brucella* agglutinins in only one person although these individuals lived in a livestock raising area where an average of 30 per cent positive reactors might have been expected.

Studies were initiated (1) to determine the existence of interfering effects between *B. suis* and *C. burnetii* in guinea pigs, (2) to determine if one infection suppressed the establishment of super-imposed infection, (3) to determine whether interference effects, if encountered, could be accounted for on the basis of conventional immunological responses in the host, and (4) to ascertain if stress stimuli could alter the interference effect between the two infections.

In order to demonstrate the existence of interfering effects between *B. suis* and *C. burnetii* infections a series of experiments was undertaken. Guinea pigs were exposed either by the respiratory route or by intraperitoneal injection and dosage as well as time intervals between exposures to *B. suis* and *C. burnetii* were controlled. Various routes of exposure were selected to determine the influence of natural defense mechanisms of the host. Thus "artificial routes", i.e. intraperitoneal and subcutaneous infection which may bypass resistance barriers, to large animals at a decided disadvantage, were supplemented by respiratory exposures to aerosols containing either or both infectious agents. In addition, both lethal and sublethal doses of *C. burnetii* were employed in these combination studies.

Following simultaneous infection of guinea pigs subcutaneously with

20 cells of *B. suis* and 1 or 100 guinea pig IP ID₅₀ intraperitoneally of *C. burnetii*, all animals were infected with *B. suis*. In addition, 48.3 per cent of the animals that simultaneously received 1 ID₅₀ of *C. burnetii* also had Q fever as indicated by positive complement fixation tests on the primary exposed combination animals. In the group receiving 100 ID₅₀ of *C. burnetii* in addition to *B. suis*, 92.6 per cent of the animals proved infected with *C. burnetii* on the basis of positive complement-fixation titers. However, when spleen homogenates from these "combination animals" were subinoculated into normal guinea pigs complement fixation titers were obtained only in 10.8 per cent (1 ID₅₀) or 13 percent (100 ID₅₀) of the secondary test animals. In contrast, control animals receiving the same dose of *C. burnetii* alone, while showing complement fixation titers in 61 per cent (1 ID₅₀) and 90 per cent (100 ID₅₀) of primary exposed animals, produced positive reactions with significantly greater frequency in secondary test animals, namely in 48.2 per cent (1 ID₅₀) and 90 per cent (100 ID₅₀) of the animals infected with spleen homogenates. These results indicated that despite the initial establishment of *C. burnetii* in the primary animals, rickettsiae were not maintained to a sufficient extent in combination with *B. suis* infection to permit comparable serological responses upon substitution of spleen homogenates in normal guinea pigs. Some type of interference between *B. suis* and *C. burnetii* therefore was indicated by results of these initial studies.

After aerosol exposure to a combination of *B. suis* and sublethal doses of *C. burnetii*, an ameliorative effect of one disease upon the other again was observed. Substitution of spleen homogenates again indicated a reduced persistence of *C. burnetii* in animals infected with *B. suis* and in addition, there was an amelioration of clinical symptoms. Changes in these clinical symptoms were intermediate between symptoms detected in groups of guinea pigs infected with either *B. suis* or *C. burnetii* alone. Gross examination and histological observations indicated a milder disease in combination animals as far as lymph node enlargement and healing of lesions were concerned.

The mortality rates of animals exposed to aerosols of *B. suis* and lethal doses of *C. burnetii* on the same day or 6 days later did not differ from that of control animals exposed to identical dose of *C. burnetii*. However, when the interval between aerosol exposure to both agents was extended to 11 days, the *Brucella* infected animals displayed marked resistance to Q fever. With a dose of 9.2×10^7 guinea pig IP ID₅₀ of *C. burnetii*, 4 of 20 *Brucella* infected animals succumbed to Q fever, as compared with 16 of 20 control animals exposed to the same dose of *C. burnetii*. Similar results were observed when the interval between exposures was 14, 28, and 42 days. Results of autopsies, culturing

from tissues, subtitration of spleen homogenates, and serological tests, performed on all survivors 20 days following exposure revealed that all combination animals actually were infected with both *B. suis* and *C. burnetii*. Comparable results were obtained when parenteral routes of inoculation were employed.

Development of increased resistance to Q fever during a specific time interval after infection with *B. suis* suggested that some immunological change might account for the previous observations. However, blood serums collected from *B. suis* infected guinea pigs when the interference effect was demonstrable at 11 days contained no detectable agglutinins. Active immunization of guinea pigs against *B. suis* with various antigenic preparations or passive immunization of animals with small and large amounts of *Brucella* antiserum did not alter the course of the *C. burnetii* infection in those animals when lethal doses were employed by various routes of inoculation. Hypersensitivity studies of *Brucella* infected guinea pigs with various *C. burnetii* intradermal antigens could not be correlated with the demonstrated interference effect between the two agents.

It has been reported in literature that large doses of irradiated homologous or heterologous influenza virus when injected in the allantoic cavity of embryonated eggs 1 to 24 hours prior to challenge with the secondary agent resulted in complete interference. In these studies no interference effect could be demonstrated when large doses of irradiated and or sonically disrupted *Brucella* cells were injected into guinea pigs within a 14 day period prior to or after *C. burnetii* infection.

Results from previous studies indicated that an active *B. suis* infection had to be established in the host animals and only after a suitable time interval can interference be demonstrated between the two infections. Confirmation of this observation was obtained by challenge of *Brucella* immunized and non immunized animals with low and high level doses of *B. suis*, and then 14 days later the guinea pigs were reinfected with *C. burnetii*. Wherever brucellosis was suppressed by previous immunization, interference was not demonstrated and guinea pigs were as susceptible as normal animals to the lethal effects of *C. burnetii*. In contrast, if the challenge dose of *B. suis* was overwhelming and active brucellosis was established, such animals were refractory to the superimposed Q fever infection.

Tissue extraction methods that were employed under various conditions failed to isolate from altered tissues of *Brucella* infected animals a component or components which on passive transfer into normal animals would make them resistant to Q fever infection. However, before an unequivocal negative answer can be given, this area of investigation must be broadened to include use of other available extraction methods.

Finally, attempts were made to alter the interference effect in *Brucella* infected animals by means of injection of compounds which induce specific stress conditions. Ethyl urethane, as an effective narcotic for inducing a state of quiescence in the host animal, could not nullify the established interference even though guinea pigs were kept under sedation for as long as 14 days. The ineffectiveness of gum camphor was clearly shown. Animals, thus treated, were kept over a 2 week period as near as possible in a state of convulsive shock. The course of both infections was unaltered during treatment with the two stressor agents.

In a literature survey no reference was found in regard to the action of thyroid hormone in rickettsial infections. In these investigations the effect of the hormone on *C. burnetii* infection was marked but its effect on the interference phenomenon per se was negative. Thyroid extract, when given simultaneously with *C. burnetii* infection alone or in combination, reduced markedly the mean survival time of exposed animals. Deaths were first recorded at 4 days after infection and by 10 days 100 per cent mortality was recorded. Maximal activity of the hormonal extract was manifested when given simultaneously with the rickettsial agent and continued thereafter, but it was ineffective when treatment began with the initial *B. suis* infection.

Much controversy has arisen about the manner by which cortisone exerts its action on the host and on many infectious processes. It appears that two major facets should be considered: (1) that interference by cortisone with the general inflammatory response in tissues is the basis for its influence on infection and (2) cortisone has a depressive effect on the reticuloendothelial (RE) cell system.

Results of present studies indicated clearly that administration of cortisone to guinea pigs simultaneously with *B. suis* and for 6 days thereafter increased their susceptibility to superimposed infection with *C. burnetii*. Cortisone had profound effects on the course of the disease pattern. The effects, in addition to increased mortality rates, included a significant reduction of splenomegaly. Liver nodules were not increased as reported by others and other organs were nearly normal in appearance and size. No differences were noted in the number of recoverable organisms from tissues of animals in treated and untreated groups. If cortisone was given simultaneously with the *C. burnetii* infection and thereafter in combination guinea pigs, then gross pathology and splenomegaly in animals were similar to untreated brucellosis controls. This suggests that with cortisone treatment of *Brucella* infected guinea pigs the overt inflammatory response associated with the infection is depressed as well as the activity of the reticuloendothelial cell system.

It is of interest that these data emphasize the importance of employing healthy animals for experimental use since failure to control interfer-

ing spontaneous infections in experimental animals may account for observed discrepancies in susceptibility of laboratory animals to specific infectious agents. Conversely, extrapolation of data from experiments in which carefully selected healthy animals were used may not always be applicable to problems concerning the natural epidemiology of various diseases.

THE EFFECT OF FERRITIN ON THE MORTALITY RATE AND SUCCINIC DEHYDROGENASE ACTIVITY OF MICE SUBJECTED TO TOURNIQUET SHOCK

by JACOB HENRY STOPAK*

INTRODUCTION

A large body of experimental data has been submitted in recent years especially from the laboratories of Shorr, Zweirach, and Mazur, proposing that a vasotropic form of ferritin, an iron-hydroxide-protein complex (crystallizable by cadmium), may be a prime factor responsible for the development of the "irreversible" stage of shock.

The experimental studies are divided into two parts: Part I is an investigation of the effects of ferritin on the mortality rate of shocked animals, and Part II is an investigation of succinic dehydrogenase activity in the liver of normal and shocked animals and of the effect of ferritin on this activity.

Part I will be presented in its entirety, to be followed by Part II.

PART I

EXPERIMENTAL

GENERAL

As a test to determine whether or not a critical role in shock may be ascribed to ferritin, an experimental method was chosen to induce a standardized trauma in mice by tourniquet application, following which ferritin was injected intravenously. It was felt that if ferritin were truly a critical agent in shock, its effect should be evidenced by an increased mortality rate of ferritin-treated shocked animals as compared with mortality rates of shocked "control" animals.

MATERIALS

Animals.—The animals employed for study throughout all experiments were healthy, female, 18-22 gram, albino mice (National Institutes of Health general-purpose strain). They were fed a standard diet of Purina animal chow and water. All animals were fasted for 15-18 hours prior to experimentation, with water ad libitum allowed.

Saline solution.—A 0.9 per cent NaCl (isotonic saline) solution was employed as diluent for the ferritin in all experiments. The doses of saline (0.1-1.0 ml.) in which ferritin was administered were well be-

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low the amounts necessary to yield a 90 per cent survival in this type of shock and gave survival responses of approximately 0 and 50 per cent, so that effects of ferritin could be compared at various levels of survival. The 1.0 ml. saline dose, in addition to furnishing a favorable level of response for comparison of effects of ferritin with saline, served to insure a prolonged degree of hypotension preceding death. (Also see Experimental Series IV.)

Ferritin.—Two different preparations of ferritin were employed for Part I, Sample A and Sample B. Both samples had been prepared from horse spleen by essentially the method of Graham.

Sample A as obtained was in the form of the cadmium salt and the method of Mazur and Short was followed to remove as much cadmium as possible. A solution of ferritin was obtained containing 600 micrograms of ferritin nitrogen (N) per ml. (Ferritin N constitutes approximately 11-12 per cent of ferritin). This solution was further concentrated (by evaporation *in vacuo* over phosphorus pentoxide) until a concentration of 1,500 micrograms ferritin N per ml. was obtained.

Sample B (10.6 milligrams ferritin N per ml.) as obtained was free of cadmium and ammonium sulfate, and aliquots were merely diluted as desired before injection.

METHODS

Tourniquet shock technique.—For production of a standardized traumatic shock the tourniquet method of Rosenthal was employed. By this method mice were subjected to a two-hour tourniquet (rubber bands) application to both hind limbs. Previous experience in this laboratory has shown this period of tourniquet application to yield a 75-100 per cent mortality in 6-24 hours in untreated animals. It was considered a suitable lethal dose of trauma to induce in our experiments, yet it was not of such severity as to mask possible effects of ferritin. Extensive investigation has also shown that this incidence of mortality could be reversed (to 10 per cent) by adequate administration of isotonic sodium solutions (15-20 per cent body weight) within the first few hours following tourniquet removal. In each series of our experiments, in addition to animals receiving ferritin, two groups of animals were designated as "controls." One such group (saline controls) received the same volume of isotonic saline in which ferritin was diluted, and the other group receiving no treatment whatever (untreated controls). (3) A lethal dose of trauma is produced. (4) Prolonged anesthesia is avoided.

Administration of fluid.—Single intravenous (lateral tail vein) injections were administered approximately one hour following tourniquet removal. Alternate animals were taken in rotation for injection of the various doses of ferritin in saline, or saline alone. One c.c. tuberculin

syringes were used for injections. Approximately thirty seconds were allowed for each injection. Injections were given 1 or 6 hours after tourniquet release.

Following injections, animals were observed frequently for mortality up to 12 hours and then checked again at 24 hours following tourniquet release.

All experiments were conducted in a constant temperature room maintained at 25-26° C. and in most instances animals were placed here during the fasting period.

The doses of ferritin employed, although arbitrarily chosen, were well above the amount found to elicit vasodepressor activity—0.0005 micrograms ferritin N—as determined by the mesoappendix technique of Shorr.

EXPERIMENTAL GROUPS AND RESULTS

Toxicity series.—Sample B was employed for limited toxicity studies: Ten normal mice were each administered approximately 3270 micrograms ferritin N in 0.3 ml. solution. All ten animals showed immediate signs of prostration, weakness, and dyspnea for 1-2 hours following injection, following which they regained a normal appearance. Two of these animals (20 per cent) died between 12-24 hours. The others lived uneventfully for two weeks, at which time they were sacrificed. Ten normal mice were each administered approximately 1000 micrograms ferritin N in 0.1 ml. solution. These animals showed only a slight initial prostration lasting but a few minutes following injection. No other untoward signs were manifest, and all animals survived (0 mortality).

Thus, it appears that a 1.0 milligram dose of ferritin N (approximately 11-12 milligrams ferritin) is well tolerated by normal mice, and that the doses administered to shocked animals cannot be considered toxic per se.

Experimental Series I.—Ferritin was administered at dose levels of 6 (19 animals), 10 (24 animals), and 20 (19 animals) micrograms ferritin N per mouse in a total fluid volume of 0.5 ml. saline. This series was comprised of three individual experiments containing 23 saline "controls" and 23 untreated "controls" in addition to animals receiving ferritin.

The first three values in the groups of figures presented below refer to the mortality of ferritin-treated animals in ascending order of dosage (6, 10, and 20 micrograms ferritin N), followed by mortality of saline and untreated "controls."

At 3 hours following tourniquet removal the per cent mortalities of the above groups were respectively: 10, 0, 21, 20, and 43 per cent;

at 6 hours: 37, 46, 53, 53, and 74 per cent; at 12 hours: 64, 58, 58, 65, and 79 per cent; and at 24 hours: 100, 96, 100, 96, and 96 per cent.

Thus the doses of ferritin administered had no adverse effect on the mortality rate of ferritin-treated vs. saline or untreated "controls."

Experimental Series II.—Ferritin was administered at dose levels of 10 (48 animals), 40 (35 animals), 100 (49 animals), and 1000 (25 animals) micrograms ferritin N per mouse in a total fluid volume of 1.0 ml. saline. In this series of four individual experiments 45 saline "controls" and 43 untreated "controls" were included.

The larger quantities of saline were employed in an attempt to obtain a more definite difference in mortality between saline and untreated controls, yet were not considered large enough to offset possible effects of ferritin.

The first four values in the groups of figures presented below refer to the mortality of ferritin-treated animals in an ascending order of dosage (10, 40, 100, and 1000 micrograms ferritin N); followed by mortality of saline and untreated "controls." At 3 hours following tourniquet removal the per cent mortalities of the above groups respectively were: 16, 7, 4, 15, 7, and 40 per cent; at 6 hours: 52, 45, 49, 44, 29, and 81 per cent; at 9 hours: 64, 51, 67, 80, 38, and 88 per cent; at 12 hours: 81, 71, 78, 100, 55, and 100 per cent; and at 24 hours: 94, 100, 92, 100, 84, and 100 per cent.

Inspection of these data indicates that ferritin exerts an effect of increasing the mortality rate as against saline controls, although the effect is not marked. The mortality rate of the ferritin-treated animals is less than that of untreated animals. A comparison between the mortality rate of all the ferritin-treated animals (taken as one group) and that of the saline controls reveals statistically significant values at the 9-hour and 12-hour periods ($t=3.27$ and 3.47 respectively). When the mortality rates of the individual groups of ferritin-treated animals are compared with those of the saline controls, statistically significant values are found at the 9-hour and 12-hour periods ($t=3.7$ and 5.2 respectively) only with the group of animals to which was given 1000 micrograms ferritin N.

Among the groups of animals no correlation is found between the doses of ferritin administered and the rate of mortality; and this is felt to be an important factor against ferritin being a critical agent in shock. However, it may be that the doses employed, although varied, were relatively of the same order in that they were above the critical level where a correlation with response might be found. But if this were so it would seem that statistically significant values would be found with doses other than 1000 micrograms ferritin N which is one-third the toxic dose (L.D. 20).

Experimental Series III.—Ferritin was administered at dose levels of

10 (22 animals), 100 (25 animals), and 1000 (6 animals) micrograms ferritin N per mouse in a total fluid volume of 0.1 ml. Twenty-three saline "controls" and 25 untreated "controls" were included in the two individual experiments comprising this series. The 6 animals receiving 1000 micrograms ferritin N died immediately following injection, but the mortality rates of the other ferritin treated animals were approximately the same as those of both control groups (which in turn approximated each other).

We cannot explain the lethal effect of 1000 micrograms ferritin N administered in 0.1 ml. saline as against its relative lack of toxicity in 1.0 ml. saline. We feel it is perhaps due to physical characteristics of such a solution in shocked animals rather than due to ferritin per se, especially when the relative enormity of the dose is considered.

Experimental Series IV.—Ferritin was administered at dose levels of 10 (28 animals) and 100 (26 animals) micrograms ferritin N per mouse in a total fluid volume of 0.5 ml. Twenty eight saline "controls" and 29 untreated "controls" were included in the two individual experiments comprising this series. In this series all animals except the untreated group were administered 2.0 ml. saline intraperitoneally immediately following tourniquet removal and an additional 1.0 ml. intraperitoneally at 3 hours. At 6 hours (after tourniquet removal) ferritin in saline or saline alone was administered. The purpose of this series was to study the effect of ferritin in mice subjected to a more prolonged period of shock, e.g., after the "hyperreactive" stage.

All of the untreated animals were dead at 6 hours after tourniquet removal. At 12 hours after tourniquet removal there were no deaths among either the saline "controls" or the animals administered ferritin. This was due to the beneficial effects of the saline previously administered to these groups. At 24 hours the mortality rates for saline "controls," and 10 and 100 microgram ferritin N groups were 14, 9, and 15 per cent respectively. At 48 hours the mortality rates for these same groups, in the same order, were 25, 19, and 31 per cent. Thus, again the mortality rates of ferritin treated animals were about the same as those of the saline "control" group.

Discussion

In consideration of the data obtained in the above described experiments, this question may be raised: Do these experimental conditions lend themselves to evaluation of this particular agent (ferritin) in light of previous findings in the literature? By "experimental conditions" we refer to: (1) type of experimental traumatic shock, (including choice of animal employed), (2) time when ferritin was administered, and (3) doses of ferritin employed.

1. The method of tourniquet shock employed, two hour tourniquet

on both hind legs, has been found to yield a 90-100 percent mortality in 12-24 hours. Thus, this procedure produces a known quantity of trauma (based on extensive experience in this laboratory) which may be considered in terms of mortality as one lethal dose of trauma. It is significant that this degree of trauma is no more than one lethal dose, since it is possible that a more severe trauma (tourniquets on 3 or 4 limbs) might have masked an effect attributable to ferritin.

2. It is likely that ferritin was administered to these shocked animals before they were in the so-called "irreversible" stage, and while they were most probably still in the so-called "reversible" stage according to the criterion of survival. By the findings of Shorr et al., this would imply: (1) the terminal vascular bed is still hyperreactive to epinephrine, (2) the liver is not yet producing the vasotropic form of ferritin, and is capable of inactivating any vasotropic ferritin which may be released from injured muscles, (3) the kidney can still eliminate ferritin which may be produced endogenously or which is administered, and (4) VEM in the blood at this stage further tends to neutralize or mask the effect of endogenous or administered ferritin.

3. If ferritin were actually a critical agent in shock, the doses administered (0.01 to 1.0 mg. ferritin N) were of sufficient magnitude to overcome possible inactivation by liver, neutralization by VEM, or elimination by the kidneys (0.0005 microgram ferritin N elicits the hyporeactive response in the mesoappendix test). In addition to the large doses employed, ferritin was injected into the tail vein. Thus several circulations were necessary to bring all of the blood-borne ferritin through the liver and kidneys.

In one case (Exp. Series II), a slightly increased mortality rate of ferritin-treated animals as compared to saline "controls" was observed. For reasons stated previously it is believed that significance cannot be attached to this finding. Moreover, the mortality response of these ferritin-treated animals was very similar to that obtained when certain plasma substitutes or magnesium salts are administered to shocked animals and is very much less than mortality evoked by injection of potassium.

Thus, by a study of rate of mortality, we have been unable to substantiate the hypothesis that the iron-bearing protein ferritin is a critical factor in irreversible shock.

PART II

EXPERIMENTAL

GENERAL

Although the oxygen consumption of liver in experimental shock has been studied by various workers and found to be depressed in most

species, this determination reveals nothing of specific enzyme activity. It would be interesting to ascertain if a portion of the lowered rate of oxygen consumption can be ascribed to derangement of the succinic dehydrogenase system; and further, what effect ferritin has on this system. This system depends for its activity on its sulfhydryl groups (as does ferritin) and so might possibly have a metabolic relationship with ferritin.

The tourniquet method of Rosenthal was used to produce a standardized traumatic shock. At 6 hours after tourniquet removal, normal (unshocked) control and surviving shocked mice were sacrificed. Their livers were immediately extirpated, weighed, and homogenized in 9 parts distilled water.

MATERIALS

Animals.—The animals employed for study throughout all experiments were healthy, female, 18–22 gram, albino mice (National Institutes of Health general-purpose strain). They were fed a standard diet of Purina animal chow and water. All animals were fasted for 15–18 hours prior to experimentation, with water ad libitum allowed.

Ferritin.—The ferritin preparation (Sample C) used for this study was free of cadmium and ammonium sulfate. It contains 6.0 milligrams ferritin N per ml. and had been found to exhibit definite vasodepressor activity.

METHODS

Tourniquet Technique.—This technique is described in full under "Methods" in Part I.

Homogenization of Liver.—The method of Potter and Elvehjem was used to homogenize the livers in 9 parts distilled water. Homogenization increases succinic dehydrogenase activity and a 30–45 second period of grinding was used. The livers were kept cold during the process.

Determination of Succinic Dehydrogenase Activity (S.D. Act.).—A modification of the method of Kun and Abood was used for determination of S.D. Act. By this method, tissue homogenates in the presence of succinate in a buffered (p.H. 7.4) medium reduce colorless tetrazolium chloride to a red water-insoluble formazan. The formazan is easily dissolved in acetone, which, by precipitating tissue proteins leaves a clear supernatant for quantitative colorimetric determinations which were carried out on the Beckman Spectrophotometer at a wavelength of 485 microns. It was found that a linear correlation between optical density and amount of dye existed in the range between 100 and 500 micrograms of reduced tetrazolium chloride. Two control blanks were run with each group of unknowns. One was a tissue blank and

the other was a group of control blanks containing given amounts of reduced tetrazolium.

EXPERIMENTAL GROUPS

A total of 60 mice were selected in rotation and the liver homogenates of each were used as follows:

1. From 20 normal mice duplicate aliquots of liver were taken for determination of succinic dehydrogenase activity of homogenate to which no ferritin was added (Group 1), and of homogenate to which ferritin (120 micrograms ferritin N) was added (Group 1a).
2. From 20 shocked mice duplicate aliquots of liver were taken for determination of succinic dehydrogenase activity of homogenate to which no ferritin was added (Group 2), and of homogenate to which ferritin (120 micrograms ferritin N) was added (Group 2a).
3. In another group of 20 shocked mice (Group 3), 120 micrograms ferritin N was administered intravenously 1 hour prior to sacrifice. Duplicate aliquots, to which no ferritin was added, were taken from each liver homogenate for determination of succinic dehydrogenase activity.

RESULTS

The enzyme activity is expressed in terms of micrograms of dye reduced in 30 minutes by 50 milligrams of wet tissue (0.5 ml. of 1:10 homogenate).

The means of the succinic dehydrogenase activities (S.D. Act.) of the various groups were as follows: Group 1 (normal mice, no ferritin added) mean S.D. Act. = 333; Group 1a (normal mice, ferritin added) mean S.D. Act. = 332; Group 2 (shocked mice, no ferritin added) mean S.D. Act. = 350; Group 2a (shocked mice, ferritin added) mean S.D. Act. = 345; Group 3 (shocked mice, ferritin administered intravenously) mean S.D. Act. = 344.

Comparison of the various means reveals by inspection that there is no significant effect on succinic dehydrogenase activity of mouse liver, of ferritin, either when added to liver homogenate or administered intravenously. The effect of shock alone also falls short of significance ($t = 1.2$).

Discussion

The purpose of Part II was two-fold: to determine the effect of shock on succinic dehydrogenase activity of liver; and to study the effect of ferritin on such activity in livers of normal and shocked animals. This enzyme is important in metabolic processes and especially in liver. As such it might be expected to undergo some change in response to a severe stressful situation such as shock. If a change were apparent and

if endogenous ferritin were causally related to such a change, it would be expected that exogenous ferritin (added to homogenate or administered intravenously shortly before sacrifice) would accentuate the change. It was found that there was no significant change in succinic dehydrogenase activity.

THE SPARTACIST UPRISING OF 1919 AND THE
CRISIS OF THE GERMAN SOCIALIST MOVEMENT:
A STUDY OF THE RELATION BETWEEN POLITICAL
THEORY AND PARTY PRACTICE

by ERIC WALDMAN •

In November of 1918, the socialists came to power in Germany in the wake of the German Revolution which was started by a spontaneous mass uprising of war-weary soldiers, sailors, and large parts of the urban civilian population. Spontaneous mass actions, beginning with a mutiny of German sailors at Kiel and spreading rapidly over the rest of Germany, had as their major aim the ending of the hopeless and costly war. As a secondary objective, the masses were determined to abolish all those institutions which they regarded as obstacles for obtaining peace from the Allies. A growing majority of the German people had come to believe that the Emperor himself was one of the main obstructions, and that he had to be removed, together with the Imperial government and the Supreme Command of the military forces. Both of these institutions had lost the people's confidence, largely because of the military defeat.

The German socialists formed a revolutionary, provisional government in spite of the fact that the German Revolution was definitely not inspired by socialist ideas. They were able to assume power simply because the masses believed that for over two years they had been oppressed to a continuation of the war and had been working toward the conclusion of an early armistice. Consequently, the socialists were the only organized political groups acceptable to the people because presumably they—and only they—could bring peace, the major objective of the mass uprising.

At the end of the war, the German socialist movement was comprised of two mass parties, the Majority Socialists (the successor to the former Social Democratic Party of Germany, SPD) and the Independent Social Democratic Party of Germany (USPD). The movement also included several other political factions, of which the Spartacist League and the Revolutionary Shop Stewards were the most important.† When the Majority Socialists took over the government from the last

† At 10:30 AM, 1919. The George Washington University, Ph.D. conferred October 1920. Professor in charge of research, Wolfgang Herbert Kraus, Professor of Political Science.
The Spartacist League (Spartakusbund) was a loose organization of left radicals, under the leadership of Rosa Luxemburg and Karl Liebknecht, in opposition to the policies of the USPD and the moderate socialist wing, which were determined to support the war effort. The group was known as "Spartakus" because they used for their illegal publications, and known as the "Spartacist League" because they were determined to serve as a counter to the influence of the moderate "work slaves". On December 31, 1918, the Spartacists founded the Communist Party of Germany (KPD).

Imperial Chancellor, Prince Max von Baden, they were uncertain as to the strength of their influence among the revolutionary masses. They did not know whether the workers' and soldiers' councils—the real power factors in Germany at the moment, which were created spontaneously wherever the revolutionary masses removed the Imperial and state authorities—were willing to cooperate with the new Reich government. It was thought possible that the councils might consider a Majority Socialist cabinet as undesirable competition to their own revolutionary ambitions. In order to broaden its base among the people, the Majority Socialists invited the Independents to participate in the government on the basis of parity. For over a month, Germany was ruled by a socialist coalition cabinet, which, in the interest of appealing to the revolutionary forces, had assumed the radical-sounding name of "Council of People's Commissars". It was a fragile coalition, however, because both parties attempted to impose their respective political concepts on the revolutionary changes. The dissension which developed within the cabinet was further aggravated by a number of bloody clashes between the Majority Socialists, who were supported by remnants of the regular army, and the left radical workers. This led to the withdrawal of the Independents from the government in December 1918. From that time until the formation of the so-called Weimar Coalition (SPD and a number of democratic "bourgeois" parties), which took place after the general elections in January 1919, the Majority Socialists enjoyed a position of political monopoly in the Reich cabinet.

The fight among the socialist factions for a dominant position in order to influence the development of the German Revolution was also carried on within the revolutionary agencies created by the mass uprising, the workers' and soldiers' councils. The latter had formed a pyramidal structure which reached its apex at the Reich level in the so-called Central Council, the permanent executive committee of the First Reich Congress of Workers' and Soldiers' Councils. (Prior to the First Reich Congress of Councils, held December 16-24, 1918, the Berlin Workers' and Soldiers' Council with its Executive Council had usurped authority for all of Germany.) Within the council system, the Majority Socialists succeeded in occupying the controlling positions after the Independents' refusal to participate in the Central Council because of their opposition to the Majority Socialists' program endorsed by the Reich Congress. Thus the two parallel governmental structures—the old state apparatus headed by the Provisional Government, the Council of People's Commissars, and the new council system with the Central Council at its helm—cooperated effectively in most localities throughout the Reich. The general tendency was to shift more and more governmental functions to the traditional agencies and to consider the councils as "supervisory" or "controlling" organs of the revolutionary masses.

The Majority Socialists, who considered themselves only as trustees of the people until general elections could be held, used their power to consolidate the political, social, and economic gains made in the course of the German Revolution. These efforts of the Majority Socialists were in complete agreement with their ideological concepts and with their confidence in the superiority of evolutionary and democratic reform methods in achieving improvements for the lower social classes. They were effectively supported by the influential trade union leaders; they were violently opposed, however, by the left radical forces such as the Spartacist League, the Revolutionary Shop Stewards, and the Berlin organization of the USPD.

A severe crisis in the socialist movement had already started during the war as the result of factional differences in matters of ideology and policies. The strong anti-war attitude of the left oppositional elements, which openly defied SPD policies supporting the war, had led to a division of the party in April 1917. This ended the formal monopoly position of the SPD within the socialist movement. A second Social Democratic mass party, the USPD, entered the political stage. However, the advent of the German Revolution brought these two socialist parties together for a short time. Factional strife concerning the aims of the revolution aggravated earlier tensions. The Majority Socialists accused the left radicals, especially the Spartacists, of plotting to overthrow the Provisional Government and of intending to erect a proletarian dictatorship in the form of a government by councils. The left radicals, in turn, charged the moderate socialists with betraying the proletarian revolution by attempting to arrest its developments and by making common front with the avowed enemies of socialism. In January 1919, the mounting tension between the two hostile camps within the socialist movement burst into open hostilities. Berlin witnessed a general strike combined with an armed uprising lasting from January 6 to 13. This event is usually referred to as the "Spartacist Uprising", in spite of the fact that an *ad hoc* revolutionary committee which charged the workers in Berlin to overthrow the Majority Socialist government was dominated not by the Spartacists but by the Revolutionary Shop Stewards.

This study attempts to investigate the nature of this crisis in the German socialist movement in the light of contemporaneous power relations and to determine its influence upon the further course of the German Revolution of 1918-19. A re-examination of the evidence appears desirable because most of the available interpretations are either based on erroneous factual premises or are highly influenced by the popular views of their authors.

Interpretations dealing with the "Spartacist Uprising" usually fall into one of the following categories: (1) The uprising was a deliberately

planned and organized attempt by the German Communists and their allied revolutionary organizations to overthrow the provisional Majority Socialist government and create a Soviet-type proletarian dictatorship. (2) The insurrection was a "defensive action" of the Berlin proletariat which was deliberately provoked by the government into open rebellion in order to furnish the government forces with a pretext to crush the revolutionary workers and their organizations prior to the elections for the national assembly on January 19, 1919.

To provide a basis for conclusions concerning the nature of this insurrection, an attempt has been made to trace the growth of those political concepts of the left wing which have a direct bearing upon the theories guiding the left radicals, primarily the Spartacists, in the formulation of their policies and actions. Contrary to the assertion of the moderate socialists, the political doctrines of the Spartacists did not envisage the use of a *coup d'état*, a violent overthrow of the government by a determined minority, as a method of acquiring political power. The political concepts of the Spartacist leaders, Rosa Luxemburg and Karl Liebknecht, stressed that only when the "revolutionary proletarian party" had succeeded in obtaining the support of the majority of the proletariat would the party, as the vanguard of the workers, assume political power from the bourgeois or quasi-bourgeois government and establish the dictatorship of the proletariat. Both Luxemburg and Liebknecht had emphasized that this situation had not been realized in Germany at the end of 1918 or the beginning of 1919. The revolutionary party had just been founded. The masses of workers still followed the "treacherous" SPD leaders. Therefore, they believed the main task of the young KPD was to "educate" the workers and make them understand that their interests were being betrayed by the SPD and USPD and that only the KPD was working consistently for the socialist revolution.

An examination of the events leading to the January fighting does not support the second assertion either. One of the most convincing arguments that the Majority Socialists did not intentionally start the series of events is the almost complete lack of physical forces available to the government at that time. When the position of power began to change in favor of the Majority Socialists, however, the determination to settle the basic issue with the revolutionary troublemakers won the upper hand.

Thus, contrary to the widespread assumption that the January Uprising was the product of a premeditated plan (by either the Majority Socialists or the left radicals), this study indicates that it was an outgrowth of the tensions which existed between the highly antagonistic camps within the socialist movement. In the opinion of this writer, the showdown of forces in January 1919 was planned neither by the Ma-

majority Socialists nor by the left radicals. It was a violent outburst resulting from the sharp hostility between the socialist factions. Its immediate cause, the Eichhorn incident, would probably have failed to produce a similar serious political crisis in a different situation.*

The defeat of the insurgents in Berlin is often credited with having ended the opportunity for the extreme left to prevent the consolidation of the German Revolution. Following the January crisis the revolutionary organizations were considerably weakened, and the government, by contrast, had the newly-formed military force, the notorious Free Corps, at its disposal to deal "forcefully" with the left oppositional elements.

The outcome of the violent conflict was that none of the socialist factions was able to gain a dominant influence on German political developments. The real victor of the struggle was neither the SPD nor the KPD, but the nationalistic and reactionary forces which came to the assistance of the Majority Socialist government. Because of the divided labor movement, they were able to survive the German Revolution and eventually to re-establish their former position of political hegemony. This was most certainly one of the major contributing factors to the growth of German Fascism and the ascendance of National Socialism.

This study also provides some insight into the early phase of the German Communist movement. Among other things it reveals a position completely independent in ideological and tactical matters from the Russian Bolsheviks. (The Communist International was not founded until March 1919.) The findings of this study thus confirm, in the case of Germany, the assertions made by such leading experts on Communism as Franz Borkenau and Hugh Seton-Watson, that during the first phase of international Communism from 1918 to 1920, foreign revolutionary movements were not directed by Moscow.

The events of the German Revolution of 1918-19 still play an important part in contemporary Communist propaganda in Germany. The Socialist Unity Party (SED) of Eastern Germany emphasizes that the working class grows in proletarian wisdom by studying the results of past theories and tactics. The SED points out that the most important lesson to be learned from the German Revolution is the need for a united working class led by a revolutionary Marxist-Leninist party. The catastrophe which befell the German labor movement under National Socialism is related directly to the divided socialist movement. Thus at the end of World War II, when a "Socialist Unity Party" was introduced by the German Communists and the Soviet Military Admin-

*The Eichhorn incident was brought about by the dismissal of the left-wing member of the Reichstag by a Social Democratic government official. The party of the Reichstag was the last time a serious political crisis had been caused by a factional dispute.

istration, this new idea found favorable response among some of the German Social Democratic leaders and some of the rank-and-file members of the SPD. When these well-meaning Social Democrats awakened to the fact that the new party was not the product of a merger of the SPD and KPD on a co-equal basis but a continuation of the KPD under a different name, it was too late to do anything about it.

A STUDY OF THE HYPERSENSITIVITY AND IMMUNITY DERIVED FROM INJECTION AND AEROSOL INHALATION OF TUBERCULOSIS VACCINES

by BENJAMIN JAMES WILSON*

Since the time of the discovery of the causative agent of tuberculosis by Robert Koch in 1882 there have been innumerable reports of experimental work aimed at devising effective immunizing agents and procedures against this disease. Vaccines consisting of killed and living, virulent and avirulent bacterial suspensions have been tried with varying degrees of success. Many investigators have also isolated certain chemical fractions from virulent strains of *Mycobacterium tuberculosis* which, it was hoped, would confer an immunity against infection when employed as vaccines.

From the very earliest experiments it was apparent that an absolute immunity against the virulent infection probably could not be realized, and that only a relative resistance could be induced as manifested by a prolongation of life of the experimental animals after challenge.

The evidence in favor of the development of local tissue immunity against foreign substances locally applied, apart from a general immune response, has not proved convincing to most immunologists. However, experimental work in the early decades of this century with vaccines against other bacterial diseases have indicated the value of vaccination by the respiratory route in inducing apparent local resistance and general immunity, provided sufficient quantity of antigen was introduced into the lower portion of the tract by the various technics employed. Recent extensive experiments have demonstrated distinct advantages of aerosol vaccination against certain virus diseases of poultry in which attenuated, living vaccines were employed.

The differences in the speed with which dermal hypersensitivity to tuberculo-protein develops as the result of varying the route of infection with tuberculosis organisms, and the differences in the inherent susceptibility of various body tissues to spread of tuberculous infection suggest that a study of the respiratory tract as a possible route for tuberculosis vaccine administration deserves consideration.

In the first immunization experiment groups of fifty-five animals each were exposed to comparable quantities of BCG (Rosenthal—hypophyzed) and ultraviolet-inactivated human strain vaccine (strain S 199) aerosols generated in a chamber of simple design. Two other groups of animals were vaccinated by dermal injection with the re-

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spective vaccines in quantities comparable to that estimated to have been inhaled from the aerosols. These animals were skin tested with Old Tuberculin in appropriate three fold dilutions over a period of approximately twenty-one weeks after vaccination.

The BCG vaccinated animals developed dermal hypersensitivity more rapidly and to a greater degree than the groups given UV-killed vaccine. BCG aerosol inhalation was less prompt in stimulating sensitivity than intradermal injection, but comparable levels of hypersensitivity were noted nine weeks after vaccination which continued throughout the twenty one weeks of testing. The animals vaccinated with the UV-killed vaccine by aerosol were sensitized as promptly and to a slightly greater degree than the dermally vaccinated animals.

Purified Protein Derivative of tuberculin did not give positive reactions in several of the individual animals reacting to Old Tuberculin. This discrepancy, however, did not follow any particular pattern with regard to type of vaccine or route of administration for the immunized groups.

Both vaccines given by the two technics produced microscopically visible lesions in the lungs of the vaccinated animals. None of the abdominal viscera examined showed any involvement. The most frequent type of lesion seen in the lungs consisted of dense accumulations of macrophages usually adjacent to bronchioles or small blood vessels. Tracheo-bronchial lymph nodes were only occasionally enlarged but apparently not infected. No significant difference was seen between the type of lesion resulting from the use of the two vaccine preparations. The dermal injections, however, often were associated with more extensive lobar involvement in the lung than that seen in the case of the aerosol-vaccinated animals. On the other hand, the latter groups exhibited a preponderance of more widely scattered, discrete lesions in the lungs the total number of which varied considerably among the individual animals.

An occasional giant cell was seen within only a small percentage of lesions, and epithelioid cells were quite rare. There was no correlation noted between the type of lesion or the extent of lung involvement and the degree of hypersensitivity. No acid-fast bacteria were noted in any of the sections stained by this technic.

A small number of the animals vaccinated and control animals from the first experiment were challenged approximately twenty-one weeks after vaccination by exposure to a highly concentrated aerosol of strain H37Rv of *Mycobacterium tuberculosis*. All of these animals developed extensive tuberculosis of the lungs which were found to be multiply studded with grossly visible tubercles ranging from discrete and proliferative in character to confluent and caseous. The animals vaccinated

with BCG by aerosol inhalation lived a significantly longer period than the controls and had the least involvement of the abdominal organs. The BCG gave somewhat more protection than the ultraviolet-inactivated vaccine by both routes of administration.

In a second immunization experiment, involving approximately five hundred fifty animals, BCG (Rosenthal) was administered at three levels, differing by approximately a hundred fold, each by six different methods. Two of these methods utilized the respiratory tract as the route of administration. One group was exposed to estimated doses of aerosolized, viable vaccine particles while the other was injected intracheally with an estimated equivalent number of particles. Further groups were injected with equivalent numbers by the intradermal, intramuscular, intraperitoneal, and intravenous routes.

Weekly skin tests employing appropriate dilutions of Old Tuberculin demonstrated that the degree of hypersensitivity in the various groups paralleled the estimated concentration of organisms (particles) used to vaccinate, although not proportionately. As in the first experiment the aerosol-vaccinated groups developed hypersensitivity less readily than the others including those injected intracheally. After six weeks, however, the difference between the aerosol vaccinated groups and the others became less, and the high level of sensitivity reached later was maintained throughout the period of study. The intradermally vaccinated animals maintained the highest level of hypersensitivity of all the immunized groups throughout the period of testing. Purified Protein Derivative gave approximately 30 per cent fewer positive reactions than the Old Tuberculin. This discrepancy was noted at random among all groups representing the various methods of administration and levels of vaccine dosage.

A later study of the factors involved in aerosol immunization revealed certain facts that probably explain the differences in hypersensitivity derived from this procedure as compared with the other vaccination methods. Aerosol recovery, particle size, and animal respiratory retention were determined quantitatively on aerosols from slurries of various bacterial suspensions generated into the chamber used for the aerosol immunization experiments.

Spores of *Bacillus subtilis* suspended in distilled water and sprayed into the chamber served as a biological standard with which different slurries and suspensions of BCG and virulent *M. tuberculosis* were compared.

Fresh cultures of the Holm strain of BCG in Dubos and Sauton medium, when aerosolized gave rather low recovery values but were below the 100 per cent average particle diameter. Respiratory tract retention was found to be a rather small percentage of the number of particles

estimated to have been inhaled based on the calculated respiratory rate and volume. A high percentage of the total retained was found to be within the lungs. The H37Rv strain in Dubos medium gave higher aerosol recovery, but a relatively lower lung retention was obtained. The average aerosol particle diameter was also slightly higher than that of the Holm BCG.

Aerosol tests simulating the conditions existing in the immunization experiments where the Rosenthal BCG resuspended vaccine was used plainly demonstrated that this vaccine suspension did not provide an entirely suitable aerosol. The percentage recovery was very low and the average particle size from the high and medium level concentrations of vaccine slurry was well above the five micron figure thought to be the critical upper limit for effective penetration into the lower respiratory tract. The fact that relatively few organisms were recovered from the lungs of animals exposed to these aerosols was probably the reason for the delayed hypersensitivity response noted in both of the foregoing immunization experiments.

Particle size samples of aerosols generated from the ultraviolet-inactivated vaccine revealed mostly smaller particles than the BCG which were shaped somewhat like crystals. It is suggested that comparable sensitizing properties of the aerosol and the dermal vaccination procedures with this vaccine may be related to the relatively small particle size of the aerosol.

That the respiratory tract is an effective route for immunization is shown by the fact that the intratracheal injection of BCG suspensions stimulated a prompt and marked hypersensitivity response which was maintained for at least several weeks. Also, even though a smaller number of particles was inhaled from the vaccine aerosols, the eventual hypersensitivity attained compared favorably with that obtained by other routes. Furthermore, the limited challenge data from the first experiment suggest that a significant degree of protection may be provided by this method of vaccine administration.

THE METABOLISM OF UREIDOSUCCINIC ACID-C¹⁴ AND ITS INCORPORATION INTO NUCLEIC ACID PYRIMIDINES IN NORMAL, TUMOR-BEARING, AND X-IRRADIATED MICE

by HELEN CHIANG-YING YEN •

Nucleic acids were discovered by Miescher in 1868; the biological importance of these materials in relation to genes, viruses, and general cell metabolism has stimulated much research on them. Little attention was paid to the pyrimidine bases by the early investigators, since these compounds were found not to be incorporated into nucleic acids. However, studies on a pyrimidine derivative, orotic acid, indicated that this substance was incorporated readily into nucleic acid pyrimidines in various organisms. A closely related compound, ureidosuccinic acid was also found to be of interest as a pyrimidine precursor. Wright *et al.* found that ureidosuccinic acid appeared to be a precursor of orotic acid in *Lactobacillus bulgaricus* and more recent work with rat tissue preparations by Wood *et al.*, by Reichard and Lagerkvist, and by Cooper and Wilson, and with bacterial enzymes by Lieberman and Kornberg, has further implicated ureidosuccinic acid as an acyclic precursor of nucleic acid pyrimidines, by way of orotic acid.

The effects of neoplastic tissue growth and of X-irradiation on the incorporation of various precursors into nucleic acids, especially deoxy-pentose nucleic acid (DNA), have been studied by many investigators. In general, nucleic acid turnover has been found to be increased above the normal level in both tumor and non-tumor tissues in tumor-bearing animals, while X-ray has been found to decrease the incorporation of most precursors into DNA.

The purpose of the present investigation was to study the *in vivo* behavior of C¹⁴-labeled ureidosuccinic acid in normal, tumor-bearing, and X-irradiated mice, with particular reference to its uptake into the individual nucleic acid pyrimidines of liver, spleen, and tumor. The effects of tumor growth and of X-irradiation on the metabolism of nucleic acid pyrimidines have also been investigated using this precursor as the tool of study.

C₃H₁ mice were employed for all the studies. The tumor used was sarcoma 37. The D,L-ureidosuccinic acid labeled with C¹⁴ in the ureido-carbon, had a specific activity of 0.12 μ c per mg.

When ureidosuccinic acid was injected intraperitoneally at a dosage of 50 mg. per kg. of animal body weight, it was found that radioactivity

* B.S. 1944, Fudan-Chinese University, Shanghai, China. M.S. 1946, Ohio State University, Columbus, Ohio. December 15, 1955. Professor in charge of research, Paul Kenneth Smith, Department of Pharmacology.

in the respiratory carbon dioxide totaled less than 5 per cent of the injected dose for the first two hours after injection, and increased to about 20 per cent by the end of 24 hours. This would indicate a significant conversion of the ureido carbon of ureidosuccinic acid to carbon dioxide, in agreement with recent studies on the metabolism of pyrimidine ring compounds (Canellakis, Rutman, Holmes). Radioassay of the urine revealed that about 50 per cent of the injected radioactivity was excreted in the urine within the first two hours, with not much further excretion for longer intervals of time up to 24 hours. The total urinary excretion was 55 to 57 per cent for the 24-hour period. Analysis of the urinary metabolites was made by paper chromatography; the major radioactive metabolite was found to be 5-carboxymethylhydantoin. This compound has been reported as a metabolite of ureidosuccinic acid in a bacterial system (Lieberman and Kornberg). Radioassay of the feces indicated that a negligible amount was excreted by way of the gastrointestinal tract. The pattern of excretion of ureidosuccinic acid observed in these experiments seems to follow that found by Hurlbert and Potter for orotic acid-6 C* in the rat.

A survey of the *in vivo* distribution of ureidosuccinic acid was carried out with normal and tumor bearing mice. About 10 per cent of the injected activity was found to be distributed among the internal organs. Analysis of the tissues included estimation of the activity in a cold TCA or acid soluble fraction as well as in a nucleic acid fraction obtained by extraction with hot TCA according to the method of Schneider. It was found that the level of radioactivity in the acid-soluble fraction was very high in the liver, especially at early stages after isotope administration, and also appreciable in the viscera, but that it was negligible in the tumor. However, in the hot TCA or nucleic acid fractions the levels showed high incorporation into liver nucleic acids, some incorporation into this fraction in the viscera, and also considerably lower but still significant uptake into the tumor nucleic acids. This finding also paralleled that found with orotic acid as studied by Hurlbert and Potter. It appears, therefore, that tumor cells differ sharply from liver cells in this respect. It is possible that the tumor cell is impermeable or otherwise inaccessible to the precursor when it is injected intraperitoneally, and that the tumor is therefore dependent upon another path of incorporation of the compound into nucleic acids. In work with tissue slices Weed found that tumor tissue incorporated orotic acid into nucleic acid more rapidly than did liver tissue; this would seem to rule out as a likely explanation a difference in enzyme distribution or action. It is possible that the incorporation in tumor might not proceed from the actual injected compound but rather from products of its metabolism formed in other tissues.

A more detailed study of the incorporation of ureidosuccinic acid into

nucleic acid pyrimidines was made in several larger groups of normal and tumor-bearing mice. The nucleic acids were isolated and separated into PNA and DNA by the method of Hammarsten. DNA was hydrolyzed by the method of Vischer and Chargaff. Individual pyrimidine components were isolated and purified by Dowex 50 ion exchange and starch chromatography (Cohn, Renhard). The purity of isolated pyrimidines was checked by UV absorption characteristics and by the ratio E_{260}/E_{280} N per ml. Radioactivity was measured at infinite thinness on glass plates in a gas flow proportional counter. Concentrations were determined from UV extinction coefficients, and the specific activities were calculated.

Ureidosuccinic acid was incorporated into all nucleic acid pyrimidines, but no radioactivity was detected in the purines. The incorporation of this compound into the liver nucleic acids in tumor-bearing mice was twice as high as that in normal mice under identical condition. This is in agreement with findings on other precursors and might indicate that tumor growth could stimulate the rate of synthesis and/or renewal of nucleic acids. A concomitant increase in nucleic acid content of the liver and other organs has been found by other workers to accompany tumor growth.

In both liver and tumor the incorporation into nuclear and cytoplasmic PNA's was of the same order of magnitude. This would agree with findings of Hurlbert and Potter on the incorporation of orotic acid at 4 hours in tumor-bearing rats. In the liver there was significantly more activity in cytoplasmic PNA uracil than in cytosine. This might support a conversion of ureidosuccinic acid to orotic acid and an incorporation by way of uridine-5-phosphate as postulated by Hurlbert and Potter. No such difference between uracil and cytosine was found in PNA of tumor cytoplasm. In both liver and tumor no real difference was observed between the two pyrimidines of DNA.

In liver the incorporation into DNA was much lower than into PNA which also confirms other work. The incorporation into liver PNA was sometimes greater than into tumor PNA while that into tumor DNA was somewhat higher than into liver DNA so that there was no great difference in the activity of PNA and DNA in tumor. A greater turnover of DNA in neoplastic tissue has also been observed by a number of previous workers and is to be expected from the high mitotic rate for this tissue.

The incorporation was also expressed as the ratio of molar activity of the compound isolated to that of the precursor to show the dilution of the precursor. On a molar basis the level of activity in liver PNA was in the order of 0.02 of that of the injected compound. This is a significant incorporation and would indicate ureidosuccinic to be a relatively good precursor of nucleic acids *in vivo* in the mouse.

A survey of distribution and a detailed investigation of incorporation into nucleic acid pyrimidines were also made with normal and X-irradiated mice. Total body X-irradiation of 400 roentgens caused a decrease in the incorporation of this compound into spleen DNA pyrimidines and approximately doubled the incorporation into PNA of both liver and spleen. This result parallels the finding of Payne *et al.* that the incorporation of P^{32} into PNA was increased by X-ray while the incorporation into DNA was depressed. The results of the distribution studies indicated that the incorporation pattern varied widely at different times after X-ray. The activity in the acid-soluble fraction of liver was above the normal level 44 and 92 hours after irradiation, but was considerably below normal 68 hours after X-ray. Similar changes could be seen in the hot TCA or nucleic acid fractions. This might indicate that inhibition as well as stimulation of the incorporation by X-irradiation varied with the time interval after X-ray.

SUMMARIES OF DISSERTATIONS
SUBMITTED FOR
THE DEGREE OF
DOCTOR OF JURIDICAL SCIENCE



FEDERAL TAX CONSEQUENCES OF CORPORATE
REORGANIZATIONS UNDER THE 1959 INTERNAL
REVENUE CODE AS AMENDED UP TO THE
INTERNAL REVENUE CODE OF 1954
By HARVEY M. MAYER

By HARVEY MILTON SPEAR •

Since World War II corporate mergers and readjustments have been increasing in frequency each year at an unprecedented rate. In recent years the federal tax consequences of such corporate transactions have become a very important influence on both their form and substance. Under the internal revenue laws of the United States, all such transactions since 1918 have been treated under the single all-inclusive heading of "Reorganization" and this statutory classification has continued through the 1939 Internal Revenue Code, as amended up to the adoption of the Internal Revenue Code of 1954. The 1954 Code reclassifies all the pertinent corporate transactions and places them together under the new general heading of "Corporate Distributions and Adjustments". This general heading is further subdivided into corporate distributions, corporate liquidations, corporate organizations and reorganizations, and into certain other related transactions. The scope of this study has been confined to corporate reorganizations and readjustments.

The scope of this study has been confined to corporate mergers and adjustments. For purposes of ready reference, such corporate mergers and adjustments will be referred to herein by the traditional and all-inclusive term "reorganization". The objective of this study is to consider to what extent the present statutory scheme for taxing reorganizations is effective in accomplishing the original legislative objectives and in meeting the requirements of taxpayers and of the business community at large.

The consensus throughout the tax field is that existing law as to the federal tax consequences of corporate reorganizations is exceedingly complicated and confused. This situation has seriously hampered necessary and desirable business readjustments and, as a result, taxpayers have been unable to carry out corporate readjustments with sufficient certainty as to their tax consequences.

The inadequacy of the present reorganization tax scheme is the result of widespread changes in the economy and in fiscal planning in recent years. These changes have been far more drastic than the corresponding changes in statutory techniques for taxing corporate reorganizations. The present trend of economic and political thinking appears moreover, to be in the direction of further encouraging business reorganizations while at the same time maintaining as many as possible

of the limitations on transactions motivated solely by tax minimization. There is in corporate taxation today a well-defined movement away from the tax theories of the 1940's toward the *laissez-faire* of the pre-New Deal days.

All these developments have been accompanied by increases over the years in the rates of both individual and corporate income taxes as well as by increases in the rates of federal estate taxes. The increase in individual income tax rates together with the ever-widening differential between capital gain and ordinary income rates have combined to stimulate the taxpayer to take his profits out of his corporation at the lower capital gain rates. In addition, these increased rates together with high federal estate tax rates and difficult estate valuation problems have also induced many taxpayers to sell, merge, liquidate, or consolidate their corporate interests with others in a manner permitting the maximum possible capital gain tax advantages.

The above factors together with the trend in today's business world toward diversification of product and of investment have led to a great increase in corporate merger and readjustment activity.

Tracing the present system of corporate income taxation back to its earliest years, we see that the present system has grown up around two important assumptions: (1) that the corporation would be taxed as a separate taxable entity and (2) that capital transactions would receive preferential tax treatment in the form of tax rates which are lower than those applicable to ordinary income.

Our system of taxing corporate income is predicated upon taxing the income once to the corporation and taxing it again when it is realized by the stockholder. As a consequence, very difficult problems have arisen over the years in distinguishing just when such income is "realized" by the stockholder and in defining the taxable event by which such income to the stockholder is to be taxed.

Other problems have arisen in determining the extent to which income will be taxed when realized by the stockholder. In the earliest statutes all income was classified together and taxed to the stockholder at one rate when realized by the stockholder. Beginning with the Revenue Act of 1921, however, Congress adopted the policy of dividing such income into so-called ordinary income and capital gain, and, over the following years, of giving a lower preferential tax rate to the capital gain. The statutory problems created by this distinction are those of defining and limiting the class of capital-gain transactions falling within the preferential tax rate.

With the above two policy assumptions as background, we examine next the legislative development of the reorganization provisions.

After the adoption of the Income Tax Amendment to the United States Constitution, all income in the early revenue statutes was treated

alike and taxed together under the simplest possible statutory arrangements. The Revenue Acts of 1913, 1916, and 1917 contained no specific provisions relating to corporate mergers and readjustments. Prior to the first statutory provisions, the Commissioner of Internal Revenue had issued rulings to the effect that no taxable income resulted from exchanges of property or stock for stock. A subsequent change of heart on the part of the Commissioner resulted, however, in statutory provisions in the Revenue Act of 1918 granting a limited exemption from tax to certain reorganization transactions. The 1918 Act did not define the term "reorganization", but the regulations subsequently defined it to include many transactions such as corporate mergers and similar readjustments.

From these comparatively modest provisions emerged the highly complex web of the current reorganization tax scheme of the Internal Revenue Code. The Revenue Act of 1921 extended the scope of the 1918 reorganization provisions and closed certain gaps in the statutory scheme. The 1921 Act also added the basic distinction between ordinary income and capital gain and then went on to make stock dividends non-taxable with a qualification, however, that the redemption of such stock dividends in a certain manner would make them taxable as ordinary dividends.

The Revenue Act of 1924 was preceded by an exhaustive study of the corporate reorganization provisions and the 1924 Act attempted to deal comprehensively with the entire reorganization field. The resulting reorganization provisions of the 1924 Act became the nucleus of all subsequent statutory enactments and the same statutory pattern was followed in the Internal Revenue Code of 1939 as amended up to the 1954 Code. The 1918 Act had treated corporate liquidation distributions as sales or exchanges of the stock involved, but the 1921 Act had not reenacted this provision when it created the distinction between ordinary income and capital gain. The 1924 Act reinserted the corporate liquidation provision thereby giving both complete and partial liquidations capital gain treatment. The spin-off corporate separation was first inserted in the 1924 Revenue Act and was continued in the 1926, 1928, and 1932 Revenue Acts.

Prior to the Revenue Act of 1934 another major revision project was undertaken by the Treasury Department and by the Congress, which resulted in the drastic overhaul made by the Revenue Act of 1934. Congress wanted to eliminate the non-taxable status for reorganization transactions, but the Treasury Department objected on the ground that, due to the depression and low values on properties taxpayers could use the reorganization provisions to accomplish substantial tax losses if the reorganization provisions were eliminated at that time.

Among the casualties of the 1934 revision program was the spin-off provision first inserted in the 1924 Act. In addition, the preferential capital gain treatment for corporate liquidation distributions was eliminated, only to be reinserted for complete liquidations in the Revenue Act of 1936, which Act also reinserted the tax on stock dividends.

From 1936 to 1942 distributions in complete liquidation of corporation were given the preferential capital gain treatment, but distributions in partial liquidation still were treated as ordinary income. The Revenue Act of 1942 extended the preferential capital gain treatment to distributions in partial liquidation, and since 1942 distributions in complete and partial liquidation have been similarly treated.

In 1950 the stock redemption provisions were expanded to cover a loophole where related corporations were used to redeem each other's stock, and in 1951 the spin-off provision was reinserted in the Internal Revenue Code after a seventeen year absence from the revenue statutes.

Beginning in 1948 leaders of the tax bar joined together under the auspices of the American Law Institute in an exhaustive project directed at revising the entire system of federal income taxation. On May 14, 1952 the Institute published its 500-page volume on the subject of corporate readjustments and distributions. During the spring of 1953 and while the Institute was working on its revision project, the committees of Congress undertook another major revenue revision project directed at completely revising the Internal Revenue Code of 1939. Hearings were held through June, July, and August 1953 and when the Second Session of the Eighty-Third Congress convened in January 1954, the House committee was presented with the results of the efforts of their staff. Further conferences on the part of this committee resulted in the 2,441-page bill entitled the "Internal Revenue Code of 1954", which, after months of concentrated tedious work, was adopted by the House.

The House in 1954 suggested a complete revision of the reorganization provisions, but less drastic measures were adopted after conference with the Senate. Many of the new provisions suggested by the House changed pre-existing tax techniques so drastically that they met formidable opposition from members of the tax bar, which opposition was to a large extent based on lack of opportunity for familiarity and adequate study. After conferences between members of the legislative and executive branches of the Government and members of the tax bar, certain new provisions and changes were finally included in the 1954 Code revision.

Although there has not been sufficient time to appraise fully the results of the 1954 revision efforts, certain observations can be made from a comparison with prior statutory techniques. The traditional statutory scheme, first adopted in 1924 and followed through the subsequent years

to the present time, has only postponed or deferred the federal tax impact on transactions in business mergers and readjustments. The statutory scheme has been drawn in such a way that the gain or loss on such transactions is not "recognized" under the Code. The recognition or tax impact only takes place when a corporation makes such a distribution to its stockholders as the statutory scheme believes should be taxed. At the one extreme, such distributions as cash and property are deemed to be taxable distributions. At the opposite extreme, the sale by a stockholder of his corporate interest is a capital transaction to the stockholder, and distributions by a corporation in complete liquidation are deemed to warrant the same result.

Between these two extremes fall the other numerous types of transactions with which we are here concerned—transactions such as distributions of stock and other property which may or may not resemble stock; distributions in redemptions of stock generally; and distributions in redemption of stock as part of a plan of partial liquidation. Similarly, between the two extremes are liquidations other than complete liquidations, i.e., partial liquidations which may or may not be a part of a plan of complete liquidation; complete liquidations of special types such as collapsible corporation liquidations; and other special kinds of liquidations. Many other special transactions also fall between these two extremes.

As a consequence of the policy assumptions that a stockholder and his corporation are separate tax entities and that there shall be a differential in tax rates between ordinary income and capital gain, there is ever-increasing pressure against the seams of the statutory scheme by efforts to get funds out of corporations at capital gain rates. Most of these efforts are cast in the form of liquidation distributions or stock redemptions which, under certain circumstances, can get capital gain treatment. The weakest point in this statutory scheme is the dividend-equivalence test which provides that when a redemption of stock is made in such manner as to be the equivalent of the distribution of a taxable dividend, it shall be treated as a taxable dividend. See Section 115(g), Internal Revenue Code of 1939.

For many years the regulations have spelled out certain tests for determining whether a particular stock redemption is a dividend equivalent, and the more important of these tests have been woven in the 1954 Code. The business contraction provisions of Section 346(b) of the 1954 Code and the vertical stock redemption provisions of Sections 302(h)(2) and (3) of the 1954 Code can be traced to Sections 39.115(c)-1(b) and 39.115(g)-1(a)(2) of Treasury Regulations 118 under the 1939 Code. Outside of these specifically mentioned transactions, however, there are many stock redemptions which might raise serious questions as to whether they are capital exchanges or dividend equivalents. Although we now have certain specific stock redemptions which under the 1954 Code may

be capital transactions, we are nevertheless left with the dividend equivalence test for other stock redemptions, and the precise meaning of this phrase is quite vague and uncertain.

Our study contains a detailed analysis of the current status of the law on stock redemptions and it is obvious from such analysis that a definite standard for measurement of dividend equivalence has been and still is urgently needed. It is more important that the test we adopt be definite and certain than that it necessarily prove 100 per cent perfect for every conceivable situation.

A suggestion for dividend equivalence which coincides with the historical development of the statutory pattern for taxing all corporate distributions and readjustments is one mentioned *inter alia* in *Kirschenbaum v. Commissioner*, 155 F. 2d 23 (C.A. 2d), certiorari denied 329 U.S. 726. The suggestion of this research project is that we have a general rule that all distributions which result in the distribution of what are or ever were accumulated earnings, and profits should be taxable as dividend distributions. This was the original objective of the dividend-equivalent test of old Section 115(g) of the 1939 Code when first it was enacted as Section 201(d) of the Revenue Act of 1921. All distributions of accumulated earnings and profits should be deemed to be dividend equivalents. In addition to an exception for complete liquidations, exclusions should be provided for those transactions to which Congress as a policy matter wishes to give capital gain treatment. The first exclusion from or exception to the general rule under present congressional policy would be bona fide business contractions similar to those referred to in Section 346(b) of the 1954 Code. Another set of exclusions or exceptions under present congressional policy would be the vertical stock redemptions now listed in Sections 302(b)(2) and (3) of the 1954 Code. All areas remaining outside these special transactions would, however, be deemed to be dividend equivalents. This suggested revision of the 1954 Code would result in far greater certainty and clarity than now exist under the new 1954 provisions.

In addition to the above-described changes in the stock redemption provisions, many other important changes were made by the 1954 Code which, for the most part, were very constructive and beneficial. These changes were made subsequent to the completion of this research project and are accordingly not discussed in detail herein. We might in passing note, however, that for the most part, the changes came about in the Senate version of the 1954 Code and were the results of efforts to adapt within the pre-existing framework the more drastic changes suggested by the House. Many of the drastic changes of the House version of the 1954 Code had presented concepts and statutory techniques which were so entirely new and different that they incurred the immediate opposition of large sections of the tax bar.

Our research project shows how inadequate the present statutory provisions are for effective taxation of corporate mergers and readjustments and particularly for taxing stock redemptions in connection therewith. In addition to the changes made by the 1954 Code, many other changes are needed. A complete overhaul of the entire system of taxing corporate transactions is required. In selecting the most effective solution, the draftsmen should be allowed to reject those pre-existing concepts which can be improved, regardless of how fundamental they might be. The new proposals should be widely publicized in detail well in advance of their formal submission to the Congress. Hearings should be scheduled after everyone has had the opportunity to study and analyze the new proposals. If the Treasury Department is interested in seriously promoting such changes, it should give careful consideration to improving its educational contacts with the public and the tax bar and to improving its public relations on the subject of changes in the fundamental statutory techniques. With better public relations and with more effective public support, a complete overhaul of the pertinent tax concepts would be possible and effective.

Since the earliest days of the corporate income tax, we have had, as noted above, two basic assumptions around which the entire system of corporate income taxation has been designed: (1) that the corporation will be taxed as a separate taxable entity from its stockholders; and (2) that there will be a distinction between capital gain and so-called ordinary income, with capital gain receiving the preferential tax treatment. A careful study of the tax problems in effecting corporate mergers and readjustments has led to the conclusion, however, that the most effective solution to the uncertainties and complexities of our present system of taxation would be to modify one or both of these basic assumptions. A start in that direction was made in the Eighty-third Congress by the commencement of the effort to eliminate the so-called "double tax" on dividends. From the opposite direction, we also hear rumblings of an effort to eliminate the preferential capital gain rates. Both changes are matters of fiscal and political implications which are by-passed in this research project. One conclusion is obvious from our study: there can be no clear and certain solution to the tax problems in corporate mergers and readjustments so long as corporations and stockholders are separately taxed, and so long as there is a substantial tax differential between ordinary income and capital gain. Greatest simplicity and certainty can be achieved only through a revision of the preferential capital gain tax rate and a revision of the separate tax entity theory. If at the policy level it is decided that we must live with both of these long-standing concepts, then we will have to continue to struggle with the very complex problems in the taxation of corporate mergers and readjustments.

A STUDY OF LEGISLATIVE SUPERVISION AND ADMINISTRATIVE PUBLIC INFORMATION FEATURES IN ENGLISH AND AMERICAN ADMINISTRATIVE LAW

by HAROLD V. BOISVERT*

In 1946 two acts were passed concerning administrative law which have had a far-reaching effect on government regulation of the public. In England, Parliament passed the Statutory Instruments Act, while in this country, Congress enacted the Administrative Procedure Act. The purpose of this thesis has been to study and compare the legislative supervision and administrative publication provisions of these modern English and American administrative procedure statutes, and in the light of such study and comparison to recommend possible reforms in both administrative systems where such is needed.

It has been pointed out that there are certain dissimilarities between the English and American legal systems and suggested that perhaps these differences are only matters of degree or approach and not necessarily constitutional differences, and that therefore administrative reforms found to be salutary in one system might profitably be transplanted into the other. These are the notable differences: (1) English administrative law has far greater scope than its American counterpart; (2) the English enabling statute, unlike the American statute, is very broad and vague—it normally has no standard such as those considered essential under the American constitutional theory of delegation of powers; (3) the English statutory instrument is the primary source of guidance, whereas in America both the statute and the regulations must be consulted by the citizenry; (4) judicial review of English administrative actions is very limited in scope and has generally been supplanted by a system of administrative appellate tribunals; (5) the English laying system is virtually unknown and unused in the United States.

LEGISLATIVE SUPERVISION

Under the English system of supervising delegated legislation, Parliament, in any statute it enacts which delegates power to an administrative body to make regulations, may make provision that the regulations made by authority of such statute be laid before Parliament. Parliament, by this method, supervises all delegated legislation which it thinks requires it.

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Such a method of review has many advantages over the slower, more expensive system of judicial review. It is preventive in character, rather than remedial. The burden and costs of review are borne by the state itself through the medium of Parliament, rather than by the individual, aggrieved citizen. It has the virtue of speed without injustice; it may be more thorough and exhaustive than judicial review. It is a more feared type of review, for it is a review which may come without warning, is usually attended by more publicity, and may result in great political reverberations.

This laying system, when coupled with an effective supervisory Parliamentary committee such as the Select Committee on Statutory Instruments, can effectively oversee the English administrative system and insure that that system does not get out of the control of Parliament. The duty of the Select Committee is to consider every statutory instrument required by law to be laid before the House of Commons upon which proceedings might be taken in either House with a view to determining whether the special attention of the House should be drawn to it.

A procedure is provided whereby the Committee must afford the administrative body originating the instrument the opportunity to make any explanations it desires, before the Committee calls the attention of the House to any defects of the instrument. This step is prescribed in order to give the Committee the opportunity to obtain explanations from the responsible executives about rules which are technical and difficult to understand, and to prevent the Committee from giving unsound advice to the House on technical matters without reference to the originating administrative officer. The reports which the Committee makes to its parent body are a very important part of the Committee's work, for as a result of the thorough presentation which the Committee makes the House is fully informed of the ramifications of every statutory instrument which is laid before the House and is able to discuss and constructively pass judgment on such instruments. Also, as a result of Committee work and recommendations, many reforms in English administrative process have been inaugurated by Parliament.

It is asserted that this same laying system can constitutionally be employed more often by Congress in order to recapture its proper constitutional control over our administrative agencies. In instances, where Congress has already used it (notably the Reorganization Acts), the result has been satisfactory.

To those who say that such a laying system would mark the end of Presidential vetoes and advisory control on a great deal of legislation in derogation of our constitutional system, it has been shown that the presently powerful Bureau of Budget, an arm of the office of the President which has no constitutional or other legal sanction for its exist-

ence, has exercised in modern times a supervision over legislation which is akin to a Presidential veto and that therefore only the time of the veto would be changed with the adoption of the laying system. The laying system would not alter the traditional distribution of power between Congress and the executive branch; on the contrary, it would restore to Congress a rightful share in the task of government, put the division of powers into constitutional alignment, and counteract the alarming concentration of powers in our administrative agencies. The justification for the creation of agencies has been their need despite the fact that there is no constitutional provision for their existence. By the same token, the laying system is needed and therefore justified despite constitutional silence regarding its authorization.

If objection be made to the laying system on the ground that a regulation approved by Congress by such method might be construed to have the force of statute although never voted on by either House, it can be argued that an administrative regulation accomplishing the same purpose without any legislative sanction whatsoever is even more offending to our constitutional system. The advocated system would be confined to quasi legislative administrative functions and would not trespass on purely executive acts. Working within these limits, such a system has been recommended by President Hoover and President Truman as a "safeguard" and as a "method of executive-legislative cooperation" and has been approved by the Supreme Court.

Such a system would work in America. With less dependence than members of Parliament on outside work to keep solvent and with more independence of party discipline, members of Congress would be able to devote more time and independent thought to the work of agency supervision. Other supervisory methods such as annual agency reports, the cutting off of agency funds, and refusal to renew agency appointments are slow, indirect, and destructive of agency morale. As a result, we find that there is no effective method today of preventing faulty or *ultra vires* regulations from going into effect. Congress and its agencies must find a system in which cooperation and understanding can develop between the two; a joint scrutinizing committee coupled with a simple system of laying before Congress would accomplish this end in a more constructive and thorough manner than the present fragmentary, expensive judicial system of review or the impotent legislative provision of allowing the public to participate in agency rule making. In states where a similar form of legislative supervision has recently been authorized, the results, although not conclusive, have not been discouraging.

The possibility of the use of the laying system in the United States as a means of improving the federal administrative process was explored by the Attorney General's Committee on Administrative Procedure,

but in its Final Report it did not recommend a general requirement that regulations of agencies be laid before Congress. However, the Report proceeded on the assumption that most of the work would have to be done by the membership of Congress as a whole rather than through the normal and familiar channel of committees, as is herein recommended. It further pointed out that even if a select committee was to be utilized, such a body could not possibly keep an informed check upon the diverse and technical regulations it would be charged with watching. The answer, of course, to both of these arguments, is that such a system is working in England today where the great body of statutory instruments being written every day is far greater than the output of our agencies.

Another recommended tool of Congressional supervision is the "Parliamentary Question". Long in effective use in England and not without precedence in this country, it offers a simple method of "executive-legislative cooperation" by conferring upon cabinet members and agency heads a privilege and a duty of explaining their departments and their problems and of giving the Senate their advice in order to enable it to legislate with better information and greater intelligence. More enlightened legislation by Congress and more effective and reasonable administrative rules would result from the inauguration of such a procedure.

Existing supervisory legislation providing for public participation in rule making is illusory supervision (i.e., no supervision) and has been discarded in England as useless. Judicial review, although slow, piecemeal, expensive, and limited in application is the only objective and effective supervisory provision in our present statutes. It is recommended that judicial review be tailored so that it will encourage and augment the work of the agencies by limiting (with some exceptions) appeals from administrative actions to one special court with a view to providing uniformity of decision throughout the nation. Such a method, which is entirely constitutional, has been used to some extent already and has proved successful whenever used.

Discouraging, however, is the fact that what little effective supervisory power exists in our laws is too often crippled and avoided by unexplained agency exemptions from the provisions thereof. Such exemptions should be repealed immediately, for such exemptions circumvent the whole spirit of the Administrative Procedure Act.

PUBLICATION PROBLEMS

With no apparent constitutional differences separating the English from the American problem of government publication, the task of both governments in this field is reduced to the function of effectively in-

forming the public. It is submitted that the public on both sides of the Atlantic would be better informed with regard to administrative matters affecting them if certain reforms which have been recommended were inaugurated.

The two major deficiencies in the English publication system are the failure to require publication of administrative sub-delegated legislation and the absence of any legislative provisions for publication or availability of administrative opinions. In these two categories, the English citizen faces a legal blackout unknown, for the most part, to the American citizen. The cure is simple—legislation should be promptly enacted which would require publication of all administrative legislation, delegated, sub-delegated, or otherwise in order to remove the shroud of secrecy from an important part of the English legislative system and to return to the English citizen his basic right to be informed of legislation affecting him. Similarly, Parliamentary prescription should provide for the availability of administrative opinions, orders, and other public records to the public. There is no reason why so important and vast a function of government as administrative process should be conducted in a closet while the actions of Parliament and the courts are scrupulously conducted for all to see and understand in the traditional style of English jurisprudence.

The English rely heavily on explanatory notes in attempting to clarify obscure and unintelligible wording in their published administrative regulations. This practice introduces the possibility of repugnancy between the text and the explanation and often sparks confusion where clarification is needed. It would appear that the remedy here is to require the administrator to concentrate on the statutory instrument itself and to make it more lucid, to expand it if necessary in order to bring out the meaning of the statutory instrument in the instrument itself rather than by the unofficial device of an explanatory note which too often does not explain.

The unique American publication problem resolves about the proper function of the Federal Register system in relation to the publication functions of our various agencies. The attempt was made by this writer to demonstrate that the Federal Register and the Code of Federal Regulations have never met with any widespread use by the American public or the American lawyer, but that the popular fount of administrative information has been the agencies themselves who generally issue attractive, more legible, and more convenient publication gratuities to the public. Although the Federal Register system should be continued in order to meet the need for a centralized official filing and publication activity and to meet the demand for such publications in large reference libraries, Congress must realize that the primary and natural distributor of agency activity information must always be the issuing agency itself.

and therefore must delegate primary responsibility for that function to the agencies. In the interests of national economy, all publication gratuities should cease and publications issued by the agencies should be supplied by the Federal Register organization from plates used in compiling the Federal Register.

Certain problems are shared alike by the American and English publication systems. Since the purpose of publication is to inform the public of agency activities which affect them, any good publication system must necessarily reach and then inform the public. The agencies can carry out their responsibility for reaching the public by familiarizing themselves with those segments of the public which will come under their regulations and the publication channels needed to reach such people and by putting competent and understanding personnel in charge of publication programs. This task is a continuing one.

In order to insure that the affected public can understand the regulations promulgated for their guidance, the emphasis on good draftsmanship must be instilled at the highest executive level in order that effective supervision can be instituted and good draftsmen recruited.

Neither the English nor the American public information systems can ever be expected to actually inform all interested persons of the latest rules and regulations affecting them. Operating as those systems do, with a small staff and a smaller budget, they cannot be expected to develop advertising and style techniques which will make their respective publications best sellers, but they can use imagination.

It is recommended that Congress, in setting up a scrutinizing committee, borrow the function of the English committee in the administrative publication field in order to oversee the compliance of the agencies with its legislative mandates in matters of publication and to insure that the public is being properly represented in this vital area of government.

Congress has the power and the available methods for effectively supervising the administrative process—it has only to exercise that power.

SUMMARIES OF DISSERTATIONS
SUBMITTED FOR
THE DEGREE OF DOCTOR OF EDUCATION

STATUS AND WORKING RELATIONSHIPS OF SUBSTITUTE TEACHERS IN URBAN SCHOOL SYSTEMS

by SAM M. LAMBERT*

Although there is one substitute teacher for every six regular teachers—a total of approximately 100,000 throughout the country as a whole—very little is known about these people and their problems. Few phases of public-school education have been subject to less research and study.

THE PROBLEM

The main purpose of this study is to discover some of the practicable ways in which substitute teachers and regular teachers can coordinate their instructional efforts in such a way as to produce a more effective program of education for today's children and youth. After compiling from the literature a list of some of the suggested "best ways" of working together, the purpose is to measure the extent to which they are used in typical situations, and, if used, the extent to which they prove helpful in actual practice.

Another important purpose is to compile current facts on the general status of the substitute-teaching force—to provide the basis for drawing comparisons between substitute and regular staff members. Such facts on status are classified according to the following categories: personal traits and characteristics, professional status, salaries, fringe benefits, and nature of the substitute-teaching job. The main task is to find out in what ways, if any, substitute teachers fail to measure up to standards now recognized and generally accepted for regular teachers.

PROCEDURE

The research procedure employed in this study consisted of the following steps:

1. A review of the literature devoted to substitute teachers and substitute-teaching service since January 1920.
2. The compilation of two lists of preliminary hypotheses, one describing working relationships that should exist between regular and substitute staff members; the other stating what the status of substitute teachers should be.
3. The preparation of two questionnaires—one to go to all superintendents of urban school systems and the other to go to a stratified sampling of substitute teachers employed in these systems. One con-

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tained eighty-three questions; the other thirty-eight. Both were designed to obtain information on status as well as on working relationships. Questions were framed to find out whether various practices were followed, and, if followed, whether or not they proved helpful in actual practice.

4. The tabulation of the questionnaires and the comparison of the results with the preliminary hypotheses to evaluate practice and validate the hypotheses.

5. An analysis of all the data collected for the purpose of identifying major problems and proposing ways to meet these problems.

LIMITS

The study is limited to "urban" school systems and to substitute teachers usually described as "day-to-day" or "temporary" substitutes. The term "urban" systems includes (1) all city-school systems containing a total population of 2,500 or more, and (2) county unit systems in which 50 per cent or more of the population lives in cities of this size or in which there is at least one city as large as 30,000. The substitute teachers included in the study usually work only a day, a few days, or a few weeks at a time and serve on an "on-call" basis. Excluded are the few substitutes who are employed on a full-time basis and who move from one school to another as needed.

FINDINGS

The dissertation reports findings on status and on working relationships separately. While space does not permit the listing of all findings, some of the more important ones in both categories are given in the following paragraphs.

Status of Substitute Teachers.—The substitute teacher in the public schools is almost invariably a woman. She is very likely to be married and to have either one or two children of her own. She is 43.6 years of age or about four years older than the typical full-time teacher. (Only 4.3 per cent of all respondents were under 25; the same per cent were 65 or older.)

Although on the average substitute teachers have less education than regular teachers, two out of three have had at least four years of college work. On the other hand, most of the formal education that the typical substitute does have was acquired several years ago. The typical substitute has not had a college course for between twelve and thirteen years. The chances are one in four that she has not had a college course in over twenty years, and one in ten that she has not had one in the last thirty years.

In the elementary schools the substitute usually teaches only those grades she is licensed to teach. (In 1953-54, 72.8 per cent taught no grades they were not certified to teach.) In the secondary schools, however, the substitute more likely than not teaches at least one subject that she is not licensed to teach. At least one in every three secondary-school substitutes does more work outside than inside her licensed fields.

The great majority of substitute teachers at one time held full-time teaching jobs. The typical substitute has not only worked as a regular teacher, she has had six years of experience in that work. The value of the experience, however, is limited by the fact that the most recent of the full-time work was done ten years ago. The median experience of substitute teachers in substitute teaching is only three years, which indicates a high rate of annual turnover in this group of teachers.

In the year 1953-54, substitute teachers worked an average of 39.0 days for which they were paid \$476, or \$12.21 per day. As compared with that of regular teachers, this rate is low—only a little over one-half as much. Also, in the typical urban school system, the substitute teacher's pay is not affected by her training and experience. The great majority of all systems pay all their substitutes the same daily rate.

In setting up programs of fringe benefits for school personnel, American school systems have left substitute teachers almost entirely out of the picture. Fringe benefits covered in the study include retirement systems, tenure protection (as a substitute teacher), written contracts, pay for legal holidays, and guaranteed quantities of work. The substitute who is permitted to share in any of these benefits is the exception rather than the rule. The only type of fringe benefit that accrues to a majority of substitute teachers is that of receiving preferential consideration for full-time jobs. Of course, this means nothing except to those who want full-time jobs, and such persons are in the minority.

Single work assignments of substitute teachers seldom extend beyond two weeks, and the typical assignment is for only one or two days. When asked to describe their most recent assignment, 55 per cent said they had never worked for the particular teacher before. In the course of a single year the typical substitute teacher substitutes for nine different teachers. If she works on the elementary-school level, she teaches different grades in the course of a year. If she works in secondary-schools, she teaches between four and five different subjects within the same period.

Working relationships.—Substitute teachers were asked, in regard to their most recent substitute-teaching assignments, whether the regular teacher left a lesson plan or at least some information about what the substitute should do during the absence. Although eight out of ten regular teachers said "yes", the lack of adequate lesson plans was the most frequently mentioned "serious obstacle" to effective substitute work.

This indicates that considerable difficulty is encountered when such plans are not left and that some of the plans that are left are less than adequate. Of the substitutes who were left a lesson plan, 99.0 per cent said it was helpful.

In three out of five cases the substitute is not called about an assignment until the morning of the day she is to report for work. In three out of ten cases she is not called until after 7:30 a.m. of the day she is to work. The lack of advance notice was the second most frequently mentioned obstacle to effective substitute work.

Regular teachers in the great majority of cases do not leave for the substitute any personal information about individual students. In reporting on their most recent assignments, only one in six substitutes said any such information was left. Thus, the substitute must find out for herself that Susie is almost dead, that Mary's mother died last week. Almost all (96.2 per cent) of the substitutes said this type of cooperation from the regular teacher is helpful.

Although the substitute teacher should carry on as much of the routine class work as she can, many substitutes let considerable amounts of such work pile up for the regular teacher. Even though 48.6 per cent of the respondents said they checked, graded, or corrected all homework and seatwork handed in or done during their most recent assignments, 17.7 per cent processed none of it and 9.1 per cent less than one half of it.

In spite of the obvious need of substitute teachers for information about school routine, over one half the respondents said none of the schools in which they had worked in 1953-54 provided a handbook or list of instructions.

The great majority of substitute teachers said the regular teachers in buildings where they had worked displayed a "friendly" attitude toward them. Hardly any substitutes said regular teachers were "unfriendly". On the other hand, 12.1 per cent of the respondents said regular teachers, on the whole, were "indifferent" toward them.

Describing their most recent assignments, two thirds of the respondents said some member of the regular staff escorted them to their classrooms; approximately one-third said someone introduced them to the pupils who were in their classrooms; a little less than two-thirds said they were introduced to teachers in nearby rooms. In each of the three instances, the tabulation of responses was limited to those who would be likely to need such assistance—those who had not taught in the school before, those who had not worked with the same pupils before, or those whose last assignment was in a large school. Forty per cent of the substitute teachers, in describing their most recent assignments, said none of the regular teachers in the school offered to help them.

Reports on special skills, indicated that less than one-half the substi-

tute teachers had ever operated a motion picture projector; and almost one-half said they "never" used films or filmstrips in their teaching.

Thirty-eight and five tenths per cent of the urban school systems have a shortage of substitute teachers for elementary-school grades; 58.4 per cent have a shortage for secondary-school grades. In certain high-school fields it is exceedingly difficult and sometimes impossible to find people who are qualified to do the work. The fields in which the shortage is most acute are in order: science, industrial arts, mathematics, home economics, foreign languages, physical education, and commercial education.

Over one-fourth of the school systems have no official schoolboard rules or regulations regarding any phase of substitute-teacher service. Less than one-fifth of the school systems have rules and regulations covering all the minimum essentials. Less than one-half the school systems have rules and regulations that tend to fix responsibility for the effective operation of this service. In short, schoolboard action in most school systems has been grossly inadequate.

In spite of the large annual turnover in the substitute-teaching force, an orientation meeting for substitute teachers is the exception rather than the rule. Where such special meetings for the substitute staff have been held, the majority of the substitute teachers have not only attended but profited from them.

Meetings in which regular and substitute teachers have an opportunity to discuss mutual problems also are the exception rather than the rule. Only 5.0 per cent of the substitutes said their districts had held such a meeting during the year 1953-54. However, when such meetings have been held, most substitutes have attended them and found them helpful.

The findings in regard to the use of committees on the coordination of regular teacher substitutes with teachers indicate that very few school systems have recognized the value of cooperative effort in this field. Few school systems in recent years have had such a committee and of those that have had one, too few have provided for substitute-teacher participation.

When the central office selects a substitute to fill a particular assignment, previous success in the school involved and in the school system as a whole and a specific type of training that matches the requirements of the job are very likely to be given major consideration. A large number of the school systems, although not the majority, also give considerable weight to the person's experience both as a regular teacher and as a substitute teacher. Thus, school systems show considerable variation toward selecting substitutes on the basis of "qualifications, demonstrated success". On the other hand, a significant number of school systems give major consideration to the order of

the substitute's turn on the list of eligibles and to the matter of giving every person on the approved list at least one assignment during the year. Major consideration of such factors is not likely to contribute much toward obtaining the best substitute teachers available.

MAJOR PROBLEMS

The dissertation enumerates a large number of specific problems brought to light by the research and proposes one or more recommendations relative to how each problem may be either partly or entirely solved. Because over fifty pages of the report are devoted to problems and recommendations, it is only possible here to deal in a general way with some of the more important ones.

One of the very important basic problems in improving substitute-teacher service is that of finding ways to handle a large portion of this work through regularly employed full-time personnel. Perhaps our greatest challenge in this field lies in developing a well-qualified, highly-skilled, full-time substitute teacher, who through experience and training becomes a well-developed specialist at teaching in one school today, in another school tomorrow, and in still another day after tomorrow. This calls for extensive reorganization of the typical school system's substitute-teacher corps. Such reorganization would involve the creation of a full-time substitute staff to handle perhaps 50, 60, or 70 per cent of all absences and a temporary, day-to-day staff to handle the rest. The plan should be developed only after a careful study of the pattern of absences by days of the week, by months, and by seasons.

The job of substitute teaching must become a better and more important job. The creation of more full-time positions in this field will help, but not all substitute work can be handled through full-time personnel. The job of day-to-day substitute teaching also has to become a better job if it is to attract and hold able and highly-qualified personnel. There is no question but that a wage of \$20 to \$25 per day would attract and hold better people than the \$8, \$10, and \$12 rates now prevailing in many systems. Not only should salary rates be higher, substitute personnel should share in the fringe benefits commonly accorded regular teachers. They should be allowed to participate in retirement systems in proportion to the amount they earn; they should draw holiday pay in proportion to the total time they work; they should enjoy tenure protection as substitute teachers; and, when other factors are equal, they should receive preferential consideration for full-time jobs that become available.

Realistic and workable solutions to problems of instructional coordination can be obtained only through the joint efforts of regular and substitute personnel. This means we need more and more personal

contacts between these teachers, more and more face-to-face situations in which they can exchange ideas on how they can be more helpful to one another. The great majority of urban school systems in the United States have not taken the first step toward cooperative work in this field.

For some reason, superintendents, principals, and other regular personnel fail to realize that substitute teachers have many of the same needs that regular teachers have. Considerable good may come from just thinking about substitute teachers every time we think about and make plans to help regular teachers. For instance, substitute teachers need to be oriented to their work just as much as regular teachers do. They, as well as regular teachers, need ways of keeping in touch with current trends and developments, opportunities to attend stimulating and useful meetings, chances to observe outstanding teaching, and a feeling that they and the work they do are important.

THE ROLE OF THE HIGH SCHOOL PRINCIPAL IN THE EXTRACURRICULAR ACTIVITIES PROGRAM

by JAMES WHITLEY SUBER •

The purpose of this study is to determine the role of the high school principal in the extracurricular activities program.

BACKGROUND AND PROCEDURES

Procedures of the study include an extensive review of the literature and a questionnaire normative survey of current practices and opinions of high school principals with regard to administering extracurricular activities.

Historically, the use of a great variety of extracurricular activities to supplement classroom instruction in our high schools is a comparatively recent development. At first activities were largely ignored. Later they were condemned by some and tolerated by others. About thirty years ago they began to be accepted and have steadily increased in esteem as the democratic concept of secondary education has gained proponents. Currently they are almost universally accepted as an integral and essential part of a good high school program.

A review of the literature pertinent to the problem resulted in its separation into three broad areas: planning the extracurricular activities program, control of it, and its evaluation. Planning, the largest area, was further classified according to subject matter into the following categories: (1) considerations given the objectives of the program, (2) factors in choosing activities needed for a good program, (3) organization of the school's personnel to administer the program, (4) ways of keeping the activities going and the program up-to-date, (5) plans for financing the program, (6) plans to meet emergencies in executing the program, and (7) limitations of the program.

The survey was limited to schools that (1) are tax supported, (2) are coeducational, (3) include the upper three or four grades of secondary education, (4) range in enrollment from 1,000 to 2,500 students, and (5) offer a non-specialized curriculum.

The questionnaires were sent to 439 schools chosen from a total of 744 meeting the above listed qualifications. This total sample included a representative sampling of schools in each of the six regional accrediting associations. A 90 per cent return representing 394 schools in 46 states was obtained, with a minimum of 80 per cent of the sample in each region.

• This work, *Minnesota State College, AM 1000*, The Center, Washington University, 1944, prepared from a study. Permission to change or restate. James Hood, Inc. 72c.
Center of Education.

THE FINDINGS

PLANNING THE PROGRAM

The findings reveal that high school principals clearly regard extracurricular activities as having an essential place in the schools' offerings. They recognize that the activities program is dynamic in nature, requiring continuous planning and modification for successful operation. Most high school principals try to conduct this planning procedure democratically. Much still needs to be done, however, in developing the full possibilities of the group approach to planning in our high schools.

Principals in over 90 per cent of the schools seek the advice of students and individual sponsors in formulating the objectives of extracurricular activities. To a lesser degree, they also consult parents and activity directors. Almost one-third of the principals have made extensive changes in the objectives of extracurricular activities in the past five years.

Interest is the chief factor in choosing activities for the program. A yearly inventory of student interests is taken by nearly one-half of the principals. Other factors which affect the selection of activities are those which also influence participation: out of school employment, transportation, and available facilities.

Leadership training for students in the extracurricular activities program is provided in 41 per cent of the schools, but only 29 per cent of them offer inservice training for teachers. Most schools follow a plan of compensating sponsors and athletic team coaches for time spent beyond the normal school day, despite the fact that only slightly more than one-half of the principals recommend such a practice.

Most schools are actively trying to attract students into the extracurricular program. Only 6 per cent require their students to participate. Publicity campaigns, orientation assemblies, and awards for worthy participation are used in at least three-fourths of the schools. Existing practices indicate that considerable effort is being made to include all students in the program.

Although various plans are followed in raising funds for extracurricular activities, students make the largest contribution to their financial support. Forty per cent of the schools have a student activity fee; 59 per cent conduct money-raising campaigns among the students; and 79 per cent charge student admission fees for athletic contests. Only in 1 per cent of the schools are the funds for the program furnished by the board of education.

Nearly one-half of the principals have an advisory committee to handle matters of an emergency nature may be referred. Principals are practically unanimous in their opposition to secret societies in their

schools; yet in about one-third of the communities, high school students belong to unauthorized fraternities and sororities.

Intramural sports and club room activities are more frequently handicapped by lack of physical facilities than are other phases of the extracurricular activities program. About one-half of the schools lack adequate playground areas and gymnasium space for the intramural program; and four-fifths are without club room facilities.

CONTROL OF THE PROGRAM

Principals try by various means to increase opportunities for students to derive the maximum benefit from participation. A well-balanced program is one of their chief goals. In some instances the full potentialities of the program are not recognized.

Most principals give students responsibilities in controlling the offerings of the extracurricular program. The student council considers applications for club charters in about two-thirds of the schools.

Over-participation in extracurricular activities is recognized in some schools as detrimental. Over one-half of the principals try to avoid over-participation by limiting the number of offices held by one student, and nearly one-third apply a point system of control.

The potentialities of the extracurricular program as a means of increasing the holding power of schools are not fully recognized. Less than one-half of the principals make a special effort to have prospective drop-outs participate in school activities.

Community pressure sometimes adversely affects the control of certain activities. Approximately one-fifth of the schools indicated a need for football stadiums that seat more than ten thousand people. This suggests over-emphasis on that sport. Similar over-emphasis may be inferred from the fact that about one-tenth of the schools indicated a need for gymnasiums seating more than three thousand spectators.

EVALUATION OF THE PROGRAM

Most principals recognize the importance of evaluating extracurricular activities. However, little evidence of effective evaluation was found in the schools surveyed. Some attempt is made by principals to gather information on the nature of the activities, the amount of participation, and the general success of the program. However, much greater use needs to be made of periodic reappraisals of the purposes of the program, the needs of students, and the current provisions for the program.

Qualitative estimates of the immediate effects of participation on certain aspects of student life are used by most principals in evaluating

outcomes of the extracurricular program. Ninety-four per cent of the principals think that participation improves discipline. Sixty-six per cent believe that it improves scholarship. Fifty-one per cent are of the opinion that it improves the holding power of the school.

Principals, to some degree, base their evaluations of the extent and distribution of participation on objective information. For example, (1) in 73 per cent of the schools at least one-half of the students participate in the program, (2) in 11 per cent of the schools boys are more active club participants than girls, and (3) in 60 per cent of the schools the senior class participates more than any other class.

Formal investigations to determine the outcomes of the program are not widely used by the principals. Only one-fourth of the principals gather evaluative data by conducting experiments or opinion polls of former students. Only 19 per cent use the results of such studies to make extensive changes in administering extracurricular activities.

THE ACTIVITY PROGRAM AND ITS PROBLEMS

Principals are making an effort to meet a great variety of student interests and needs. (Over six hundred different activities were listed. More than one-half of the principals commented on their problems with 347 comments. These were grouped into eleven types of problems.

Seventy-six per cent of the comments dealt with five problems, namely: 22 per cent with participation in general; 20 per cent with scheduling; 16 per cent with sponsorship; 10 per cent with control; and 8 per cent with financing the program.

CRITERIA OF GOOD ADMINISTRATIVE PRACTICES

From the comments of respondents and an analysis of reported practices the following criteria for the good administration of extracurricular activities are suggested:

PLANNING

1. The principal should provide dynamic leadership especially during the planning stages of the program.
2. Planning of the extracurricular activities program should be a cooperative process, involving sponsors, students, and parents.
3. The principal should organize the program to utilize available physical facilities to the best advantage.
4. The principal should regard the program as flexible and subject to periodic reappraisal.
5. The principal should require that each activity have purposes consistent with the purposes of the school.

6. The extracurricular program should be firmly based on the interests of students and sponsors.

7. Good administration requires that the principal accept responsibility for seeing that sponsors are adequately prepared for their sponsorship assignments.

8. Procedures for handling the finances of the program should be easy to administer, provide adequate safeguards, and provide fruitful experiences for students.

9. Leadership training should be provided to assist student leaders to meet their responsibilities.

10. The principal should have an advisory council of students, teachers, and parents to advise him in solving administrative problems relating to the extracurricular program.

11. Adequate informational services should be provided to acquaint students, sponsors, and parents with the offerings and achievements of the extracurricular program.

CONTROL

1. Participation in activities should be on a voluntary basis.

2. Students should be encouraged to take an active part in all extracurricular activities of which they are members.

3. Requirements for club membership should be kept at a minimum in order to provide maximum opportunity for student participation.

4. Machinery to prevent over-participation should be set up.

5. The school should schedule extracurricular activities at a time that is convenient for the greatest number of students.

6. General policies for meeting emergencies that may arise in the program should be established and kept current.

7. Point systems and other means of controlling extracurricular activities should be adopted only after careful consideration of their beneficial effects on participation.

8. The principal should direct the extracurricular program toward eliminating causes of maladjustment of students in the school.

EVALUATION

1. Appraisal of extracurricular activities should be in terms of the purposes of the program.

2. Both individual activities and the activities program as a whole should be evaluated.

3. Subjective and objective methods should both be used in evaluating the outcomes of the program.

4. When deciding the number and types of activities to be offered

by the school, the principal should be guided by results of evaluations.

5. The principal should modify his administrative procedures in the light of careful evaluation of the program.

CONCLUDING STATEMENT

Generally speaking, administrative practices used in the extracurricular program are good, although some shortcomings exist. However, principals are aware of most weaknesses and are making efforts to eliminate them.

Principals usually assume the role of coordinator and leader in administering the program. In most situations they are succeeding remarkably well.

SUMMARY OF DISSERTATION
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MANAGEMENT ASPECTS OF THE EVOLUTION OF AUTOMATION WITH ELECTRONICS AS A CONTRIBUTING FACTOR

by RALPH JOHAN HERMAN LILJELUND •

In this study, the management aspects of automation are considered from various points of view. Part I is devoted to the field of automation. The basic elements of modern automatic control systems have their counterparts in many of the major undertakings of ancient times. The slave ships present a typical example. The abacus was an early forerunner to the modern computer. Nature long ago assigned great importance to feedback control. The human body automatically regulates, for example, the chemical concentration of hydrogen, sugar, protein, fat, calcium, and salt in the blood.

The present status of automatic control in industry is mainly the result of developments during the past 170 years. A flour mill by Oliver Evans (1784), a musket factory by Eli Whitney (1798), the endless monorails in the meat-packing industry (1860), and the assembly lines of Henry Ford (1914), all represent successive steps in the development of automatic controls. The automatic loom by Joseph Jacquard (1801) and the mechanical computers by Charles Babbage (1822) represent additional phases of this development. Finally, the evolution of electronics during and since World War II supplied the forces by means of which automatic control has emerged today as a separate field. Many obstacles and problems present themselves for management in connection with the promotion of automatic controls. Adverse management attitude, high initial and development costs, shortage of qualified personnel, upgrading of personnel, resistance from labor unions, and the high degree of obsolescence connected with new equipment, are only some of these obstacles and problems.

The literature on automation has grown rapidly during the last few years. The literature is classified as follows: the general management aspects, special applications, the instrumentation and electronics aspects, cybernetics, and the social aspects.

With the purpose of clarifying the present confusion in the field an original definition for the new technique is presented as follows:

Automation means the application of machinery to perform and control automatically and continuously all or part of manufacturing operations in a given plant or factory—from the physical input to the finished output of that plant.

Complete automation exists when all operations are automated.

Partial automation (0 to 99.9 per cent) when only a part of the operations are automated. Some of the progress toward uniformity of terminology in this field is briefly described.

The present study of the problem of automation was carried out partly by means of investigating the literature. The second part of the investigation takes up the engineering phase of automation for detailed study, and the role of electronics is examined more closely. The third part includes the results of a survey of the control instrument industry. The fourth part gives the management aspects of automation in detail from the viewpoint of the individual firm, and the fifth part covers the economic and social aspects. The study ends with the summary and the conclusions of this investigation presenting also a review of the problems of automation. A bibliography including 247 references is supplied.

Part II presents the engineering phase of automation. The progressive steps toward the completely automatic plant are given in diagram form. The different viewpoints on automation prevailing in five industries are presented. The continuous-flow industries are most advanced in this field. Many such plants are on a very high level of automation. The assembly-type industries must overcome several handicaps inherent in the production and processes used, before automation can take any great strides forward. One major problem is that of assembly which has not, thus far, lent itself to complete automatic control, except in a few isolated cases. The machine tool industry has developed a transfer machine as a major step towards automation. While the material-handling industry is developing automatic devices to replace manual labor, it will not greatly affect the process of automation. The control-instrument industry, on the other hand, is quite active in the field and may become a leader.

Five different approaches to the process of automation may be distinguished. It is possible to automate any process in production, to accomplish virtually any production function automatically—if it can be justified economically. Automation can and should be considered wherever there is a continuous flow of materials and parts between two fixed points. Diagrams of closed cycle plus feedback, open manual cycle, and closed automatic cycle illustrate the feedback feature of automated equipment. The main groups of devices used in the process of automation are as follows: mechanical, pneumatic, electric, hydraulic, electronic, and electro-mechanical. Vacuum tube systems have been unchallenged for many years in the field of measurements, from which there is but a short step to control, and the electronic controls are especially suitable for complete automatic processes and feedback control.

Activity in the field of automation has increased considerably during the last few years. Two important expositions closely connected with

automation were held during 1954. Different groups, such as universities, societies, and labor unions, have shown considerable interest in automation. In 1954 the nation seemed suddenly to become more aware of the field of instrumentation, that is, measurement and control. Many projects closely connected with automation are being sponsored by various government agencies. Industry as a whole will greatly benefit from these developments.

Some of the early developments of electronic controls are mentioned and present applications are described. A diagram is presented showing a commonly used electronic control system in the process industry. The advantages of electronic control systems are weighed against the disadvantages. The computers of today are described. The various systems to be used in the process of automation will greatly benefit from the rapid development in the field of computers, especially the analog computers. Further, the new electronic components recently perfected, such as transistors, magnetic amplifiers, and printed circuits, will contribute to the general progress in automation and, especially, to the use of electronics in this process. Industrial electronics seems to have great growth potential and the electronics market of today shows a rapid rate of expansion.

Part III presents the results of the survey of the electronics industry. Because the control instrument industry was considered to be the leader in the field of automation, it was selected as the subject for the survey. The survey was made by correspondence with American companies producing controls, instruments, and other devices to be used in the process of automation. All the participating companies in the First International Instrument Congress (Philadelphia, September 1954) and in the First International Automation Exposition (New York, November-December 1954) were selected to be surveyed. Three letters, each including a detailed questionnaire, were sent to each of the total of 421 different companies, one directed to the president or vice president; one to the production manager, chief engineer, or director of research; and one to the sales or marketing manager. The first group of questions included ten general questions on automation, of which the first concerned a suitable definition for the word "Automation". The second group of questions dealt with electronics in the process of automation; the third, with the management aspects of automation; and the fourth with some particulars on the company surveyed.

The total response in the survey amounted to 27.81 per cent of the persons to whom inquiries were sent. The original definition presented by the author was approved by two thirds of the respondents. The two approaches to automation preferred by the respondents were to automate at the lowest level with routine jobs first, and to design and construct

new equipment especially for automation. Flexibility of equipment in the process of automation was considered a requirement. A slight majority of the respondents had the opinion that the technical problems of complete automation will soon be solved. Almost two thirds thought that working with complete systems would advance partial automation. The electronic and electro-mechanical devices received an overwhelming support from the respondents as the most important devices for progress in automation. Thirteen of the questions in this group dealt with the management aspects of automation. In general, the answers agreed fairly well with the views held by the author. These views are presented in the fourth part of this investigation.

Finally, the geographical distribution of the responding companies was studied and compared with one on the electronic industry made and published by the magazine *Steel* in 1954. Quite close agreement was found. The South showed a low response of 2.4 per cent in this survey compared with 9.7 per cent of the electronics industry. Further, Ohio showed a response of 8.7 per cent compared with a minimum of electronics industry as indicated by *Steel*. The similarity of these two geographical patterns indicates that there is a relation between the interest for automation in the control instrument industry and the electronic industry. The instruments act as a common denominator, and they are mostly electronically composed.

Part IV takes up the effects of automation in five important areas of management, that is, production, organization, plant management, finance, and marketing. Finally, automation as applied in offices is considered. The reasons for the movement toward increased partial automation are manifold. The businessman's search for competitive advantages, desire for uniform quality of product, disagreements with organized labor, and the movement of the scientist from laboratory to industry are some of these reasons. The importance of management's attitude toward automation cannot be underestimated. Also, small business should be aware of the new possibilities offered by automation. Changed personnel requirements will be caused by the progressing partial automation and, generally, higher skills will be required.

When production becomes more automated, management must change its views on the production processes. The processes must be integrated into a coordinated system. Finally, a single overriding control must be applied covering all the systems and processes. At each stage the required element of control is the closed-loop or feedback system. Degree of flexibility required, redesigning the product, and rethinking of the over-all production process are additional factors to be considered by management. Operations research will assume great importance in partial automation.

Organization for the completely automated plant in which there are

only two levels, that is, the primary and secondary problem-solving level, is likely to change in the course of time. There will be no president per se in the model outlined here, since he will be superseded by the five top executives, who work closely as the top-management team and form the primary problem-solving level of the company. Each of the five persons heads a team in his own department, and each team consists of various managers and other high-level specialists. They form the secondary problem-solving level. Centralization and rapid internal communications will be most important requirements of organization of the completely automated plant. Specialization among technical people will be required for top-level executive positions.

The progress in partial automation is essentially an economic consideration. The cost consideration enters into management thinking on automation. It is, today at least, often practical to automate only part of the whole process. One serious problem is presented by the rapid obsolescence of automation equipment. The problem of estimating the probable economic life of new equipment will become more difficult. Most managements are satisfied with an amortization period of 3 to 5 years but even shorter periods are already in use. Comparison of break-even points for a conventional plant and for an almost completely automated plant show that fixed charges form a much greater part of costs in the latter type. A good index for determining how far automation has progressed is the annual production of measuring and controlling instruments. After hesitation during the depression and war years, the curve for the expenditure on control instruments is now rising rapidly.

Part V takes up some of the economic and social aspects of the evolution of automation. Even if a new industrial revolution is not realized, the fact that many of the nation's factories and plants will some day become automatically controlled is a probability, if not a certainty. People in industry and government must recognize and anticipate this development. Mass markets will be urgently needed. The pricing policies of management will be of great importance to the whole economy. Is the individual management prepared and ready to divide the gains between all the contributing factors? This question leads to the required social consciousness which will be increasingly required from the management of the automated plant.

The chief revolution of the present time is not one of social dogmas but one of industrial techniques and practices. Therefore, the role of the industrial management is one of ever increasing importance in society. The progress in partial automation will change the character of the labor force. An upgrading process will set in with increased automation. The flexibility of the American worker can, however, be trusted to take the upgrading without any major changes in the social structure.

The rapidly changing technology favors the young man who has been trained in new theories and techniques. The problem of the older workers must be satisfactorily solved by management. Some discussion is presented about the labor force in the next few years and the position of the labor unions on the question of automation. Technological unemployment will not reach national dimensions, but localized disturbances will occur. The increased leisure will present some problems, and it will also give rise to additional new industries and, thus, create new jobs for people. Other aspects of automation include, for example, the education and training needed, the possible role of technical societies, and the possibilities offered through automation in the underdeveloped countries of the world.

Part VI of the study presents a review of the problem of automation. The evolution of automation will be limited; it will progress to that point at which people cease to prefer low price and begin to prefer uniqueness, personal service, and a "handmade" article. The conclusions of this investigation are summarized in seven main points as follows:

1. There will not be a major upheaval in our society due to the movement toward the completely automated plant.
2. There are several different approaches to automation and still some confusion among various industries. Feedback is the leading feature in the process of automation.
3. Electronics is and will continue to be the most important single factor in the evolution of automation. The advantages of using electronics devices and components in the process of automation cannot be overestimated.
4. The control instrument industry will lead the development toward a high degree of partial automation.
5. Industrial management must do much rethinking along the lines required by automation.
6. The advantages derived from increased automation include lower costs of products, higher speeds and productivity, higher quality of output, and greater safety of personnel.
7. Management should develop its social consciousness, and feel the responsibility for personnel replaced by the machines. Also, it must prepare for changes in its own organization, functions, etc. Further, training of personnel will be of high importance in moving toward more highly automated plants.

